
rerouted during Cell Tower Project 10-25-16

| LEGEND | |
|---|---|
| STORM LINE | |
| SD MANHOLE | |
| SD CATCH BASIN | |
| CURB INLET | |
| FIELD INLET | |

Benton County
Public Works Department
360 SW Avery Avenue
Corvallis, Oregon 97333
Phone: 541-766-6821
FAX: 541-766-6891

Date: 26 July, 2011

Renewal Date:

# BENTON COUNTY FAIR GROUNDS UTILITY AS-BUILTS

TL 300, 11S, R5W, SECTION 32 - 53rd Street

## STORMDRAIN SYSTEM

| Revision Description | Date | Initials |
|---|---|---|
| MODIFIED STORM | 10-17-12 | APM |

Scale: 1" = 60'

Drawn by: APM
Designed by: APM

Project #: B-25

File Location: G:/Avery ProjMgmt/OtherDepts/Fairgrounds

Index Number: U-1.7

Sheet # 7 of 8 Sheets

| LEGEND | |
|---|---|
| STORM LINE | |
| SD MANHOLE | |
| SD CATCH BASIN | |
| CURB INLET | |
| FIELD INLET | |
| SEWERLINE | |
| SS MANHOLE | |
| SS CLEANOUT | |
| WASH RACK | |
| RV HOOKUP | |
| WATERLINE | |
| WATER METER | |
| WATER VALVE | |
| FIRE HYDRANT | |
| IRRIGATION LINE | |
| IRR-BALL VALVE | |
| IRR_TWIST LOCK | |
| IRR- VALVE BOX | |
| STAND PIPE | |
| IRR-HORSE BIB | |
| GAS LINE | |
| GAS POINT | |
| POWERLINE | |
| POWER POINT | |
| POWER POLE | |
| SIGN BOARD | |
| TELE-LINE | |
| TELE-POINT | |



Benton County
Public Works Department
360 SW Avery Avenue
Corvallis, Oregon 97333
Phone: 541-766-6821
FAX: 541-766-6891


Date: 13 October, 2010

Renewal Date:

# BENTON COUNTY FAIR GROUNDS UTILITY AS-BUILTS

TL 300, 11S, R5W, SECTION 32 - 53rd Street

## UTILITY SYSTEMS

| Revision Description | Date | Initials |
|---|---|---|
| MODIFIED STORM | 10-13-10 | APM |

Scale: 1" = 60'

Drawn by: APM Designed by: APM

Project #: B-25

File Location: G:/Avery ProjMgmt/OtherDepts/Fairgrounds

Index Number: U-1.8

Sheet # 8 of 8 Sheets

# RFP 2325-04 Engineer's Drawings - Corrected

# A NEW STORAGE POLE BUILDING
# AT
# BENTON COUNTY FAIRGROUNDS
## 110 SW 53rd ST
## CORVALLIS, OR 97333

### DESIGN INFORMATION

1. ALL WORK SHALL COMPLY WITH THE STATE OF OREGON 2022 EDITION OF THE OREGON STRUCTURAL SPECIALTY CODE 2010 ASCE 7-16; 2018 NATIONAL DESIGN SPECIFICATION; 2015 SDPWS
2. FLOOR LIVE LOAD: 40 P.S.F.
3. ROOF LIVE LOAD: 25 P.S.F.
4. SNOW LOAD:

| | |
|---|---|
| FLAT-ROOF SNOW LOAD, Pf: | 9.0 P.S.F. SEAO WEB SITE MODELED ELEVATION: 285 FT GOOGLE EARTH ELEV: 268 FT |
| SNOW EXPOSURE FACTOR, Ce: | 1.0 |
| TERRAIN CATEGORY: | C |
| EXPOSURE: | PARTIALLY |
| SNOW LOAD IMPORTANCE FACTOR, I: | 1.0 |
| THERMAL FACTOR, Ct: | 1.0 |
| DRIFT SURCHARGE LOAD, Pd: | WHERE SUM OF Pd & Pf EXCEEDS 20 PSF: NA |
| DRIFT WIDTH, w: | NA |

5. WIND DESIGN DATA:

| | |
|---|---|
| ULTIMATE DESIGN WIND SPEED, Vult: | 96 M.P.H. (3-SEC GUST) |
| NOMINAL DESIGN WIND SPEED, Vasd: | 74 M.P.H |
| RISK CATEGORY (2022 OSSC, 1604.5): | II |
| WIND EXPOSURE: | C |
| APPLICABLE INTERNAL PRESS. COEFF.: | 0.18± PSF |
| DESIGN WIND PRESS. FOR C&C: | 18 PSF |

6. EARTHQUAKE DESIGN DATA:

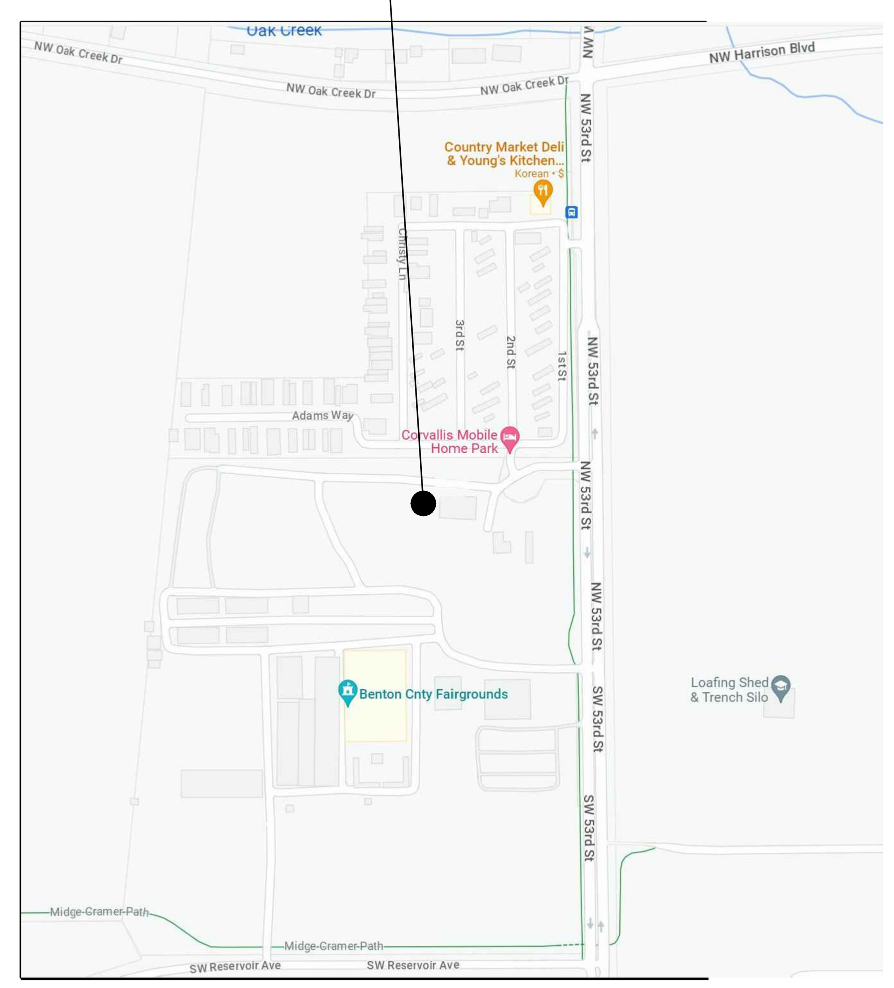
| | |
|---|---|
| RISK CATEGORY | II |
| SEISMIC IMPORTANCE FACTOR, Ie: | 1.0 |
| MAPPED SPECTRAL RESPONSE ACCELERATIONS: | |
| Ss: | 0.904 g |
| S1: | 0.478 g |
| SITE CLASS: | D |
| DESIGN SPECTRAL RESPONSE COEFFICIENTS: | |
| SDS: | 0.686 g |
| SD1: | 0.860 g |
| SEISMIC DESIGN CATEGORY: | D |
| SEISMIC FORCE RESISTING SYSTEM: | CANTILEVERED COLUMN SYSTEMS TIMBER FRAMES |
| DESIGN BASE SHEAR, V (SEISMIC): | 20.13 KIPS, N/S; 18.56 KIPS, E/W |
| SEISMIC RESPONSE COEFF. Cs: | 0.4572 |
| RESPONSE MODIFICATION FACTOR, R: | 1 1/2 |
| ANALYSIS PROCEDURE: | EQUIVALENT LATERAL FORCE (ELF) |

7. GEOTECHNICAL INFORMATION:
   DESIGN LOAD BEARING VALUE: 1500 P.S.F. (ASSUMED)
8. FLOOD DESIGN DATA:
   FIRM MAP NUMBER: MAP NO.: 41003C0180F; EFFECTIVE DATE: 6/2/2011
   ZONE: ZONE X. AREA DETERMINED TO BE OUTSIDE THE 100- AND 500-YEAR FLOODPLAINS.
9. SPECIAL LOADS: NONE.
10. PHOTOVOLTAIC PANEL SYSTEM LOAD: NA
11. ROOF RAIN INTENSITY, i: NA IN/HR
12. SPECIAL INSPECTIONS (SEISMIC): NA
13. ZONING: P - PUBLIC ZONE

### NOTE

1. THE CONTRACTOR SHALL ENSURE THAT CONSTRUCTION MEANS AND METHODS, INCLUDING LOADING AND BRACING, SHALL NOT EXCEED THE CAPACITY OF STRUCTURAL MEMBERS.

PROJECT LOCATION
110 SW 53rd ST
CORVALLIS, OR 97333




### VICINITY PLAN

SCALE: NTS

N

### CODE ANALYSIS

FOR DETAILED ANALYSIS SEE SHEET A/S8.0

| | |
|---|---|
| OCCUPANCY | INTERIOR OFFICE AND STORAGE AREA B AND S-1 |
| CONSTRUCTION TYPE | V, B |
| AUTOMATIC SPRINKLER | NOT REQUIRED |
| BUILDING HEIGHT | EXISTING: 18'-0" ROOF MEAN HEIGHT |
| BUILDING WIDTH & LENGTH | 40'x76' |
| NUMBER OF STORIES | 1 |

### PROJECT DESCRIPTION

THE PROJECT IS TO CONSTRUCT A 76'x40' POLE BUILDING WITH 14' WALLS AND A 4:12 PITCH ROOF. THE BUILDING IS TO HAVE WOOD GIRTS, EXCEPT AT THE OFFICE, WOOD STUDS. THE BUILDING SURFACE IS TO BE COVERED WITH METAL SIDING AND METAL ROOFING.

THE BUILDING IS PLANNED TO STORE AGRICULTURAL TRACTORS, TEMPORARY FENCING, TRAFFIC SIGNAGE, BARRICADES, LAWN MOWERS, GOLF CARTS AND FORK LIFTS.

STORAGE OF HAZADAROUS MATERIAL IS PLANNED TO BE A MAXIMUM OF 20 GALLONS OR LESS FOR GASOLINE AND/OR A MAXIMUM OF 20 GALLONS OR LESS OF DIESEL FUEL.

### PROJECT DESIGN

| | | |
|---|---|---|
| PROJECT ENGINEER: | WILLIAM E. BARLOW, P.E.<br>P.O. BOX 43<br>PHILOMATH, OR 97370 | 541-609-8777 |
| PROJECT MANAGER: | SHANE GALLOWAY<br>1200 SW AVERY PARK DR.<br>CORVALLIS, OR 97333 | 541-760-3741 |

### SITE LOCATION

TAX MAP/LOT: 11 5 32D/300
BENTON COUNTY
LATITUDE: 44.568220
LONGITUDE: -123.313783

### SQUARE FOOTAGE

| | | |
|---|---|---|
| STORAGE AREA: | 2912 | SQ FT |
| INTERIOR OFFICE: | 288 | |
| POLE BLDG TOTAL AREA: | 3200 | SQ FT |

### INDEX TO DRAWINGS



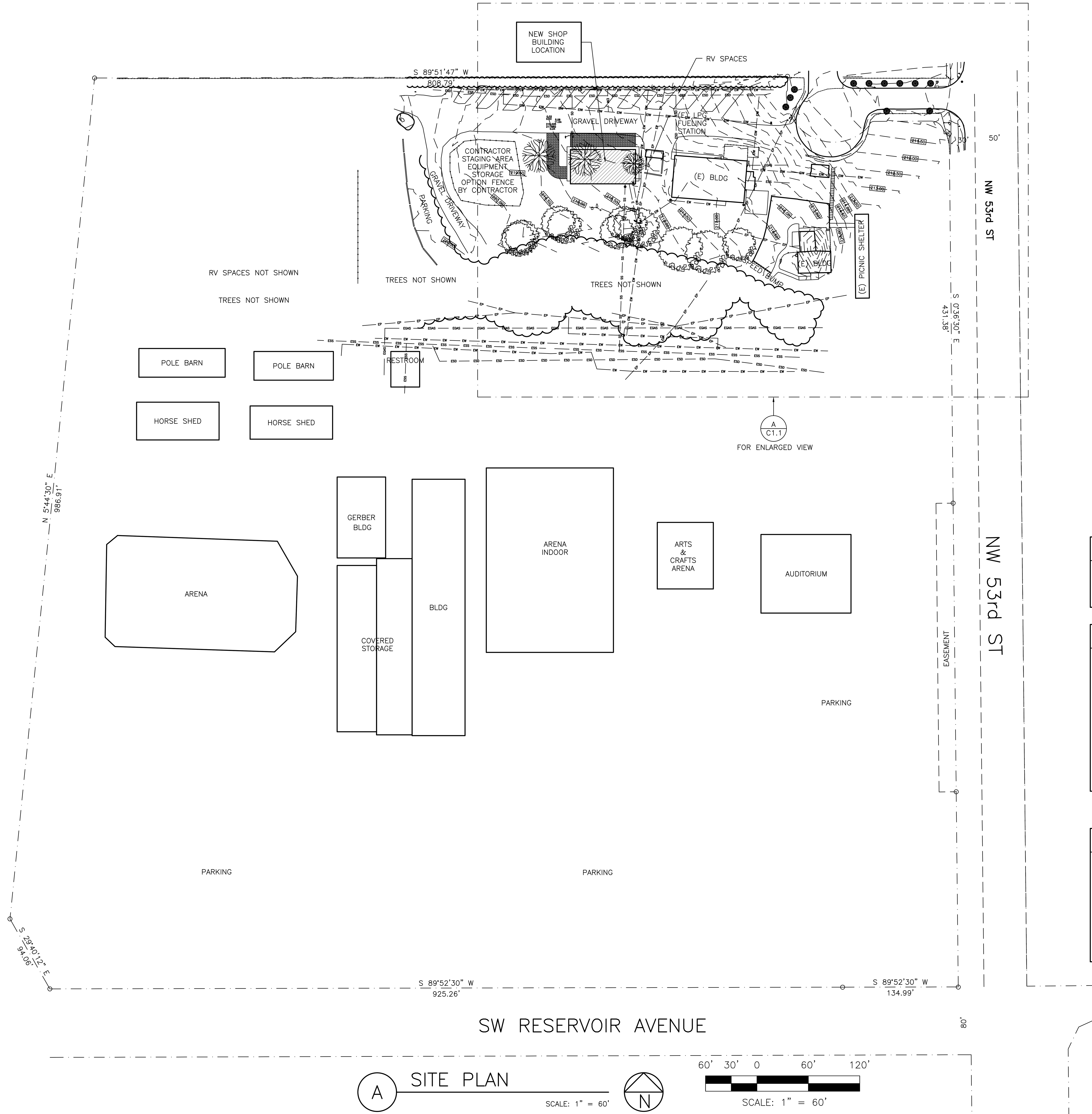
| REVISIONS | BY |
|---|---|
| REV. 1 DRAWING SET REVISED 1.17.24 | WEB |

A NEW STORAGE POLE BUILDING
110 SW 53rd ST
CORVALLIS, OR 97333
TITLE SHEET

PROFESSIONAL ENGINEER
ENGINEER
16581
digitally signed
OREGON
JUL 20, 1993
WILLIAM E BARLOW
EXPIRES: 12/31/25


CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com


| | |
|---|---|
| DATE | 1.17.2024 |
| SCALE | AS SHOWN |
| DRAWN | WEB |
| SHEET | T0.0 |




A SITE PLAN

SCALE: 1" = 60'

N

60' 30' 0 60' 120'

SCALE: 1" = 60'

## GENERAL NOTES

1. ALL SITE SPOILS SHALL BE REMOVED FROM THE SITE.
1. VERIFY LOCATION OF SERVICE BY POT HOLE.

## LEGEND

NOTE: PARTIAL VIEW OF SERVICES ONLY

| | |
|---|---|
| —EP—EP—EP— | EXISTING ELECTRIC POWER |
| —EGAS—EGAS—EGAS— | EXISTING GAS |
| —ETEL—ETEL—ETEL— | EXISTING COMMUNICATION |
| —EW—EW—EW— | EXISTING WATER |
| —EIRR—EIRR—EIRR— | EXISTING IRRIGATION |
| —ESS—ESS—ESS— | EXISTING SANITARY SEWER |
| —ESD—ESD—ESD— | EXISTING STORM DRAIN |
| —E—E—E— | NEW ELECTRIC POWER |
| —T—T—T— | NEW COMMUNICATION |
| —W—W—W— | NEW WATER |
| —SS—SS—SS— | NEW SANITARY SEWER |
| —SD—SD—SD— | NEW STORM DRAIN |

## NOTE

THIS IS NOT A BOUNDRY SURVEY. PROPERTY LINES SHOWN ARE BASED ON SURVEY DRAWINGS: CS10421 AND TAX MAP/LOT: 11 5 32 D/300 PROPERTY LINES ARE A GRAPHIC REPRESENTATION TO SHOW RELATIONSHIP OF PROPERTY LINES TO SITE PHYSICAL INFORMATION.

CONTOURS AT 0.5 FT INTERVAL
TOPOGRAPHIC SURVEY BY:
WILLIAM E. BARLOW, P.E.
PHILOMATH, OR
OCTOBER 23, 2023

| REVISIONS | BY |
|---|---|
| | |

# A NEW STORAGE POLE BUILDING

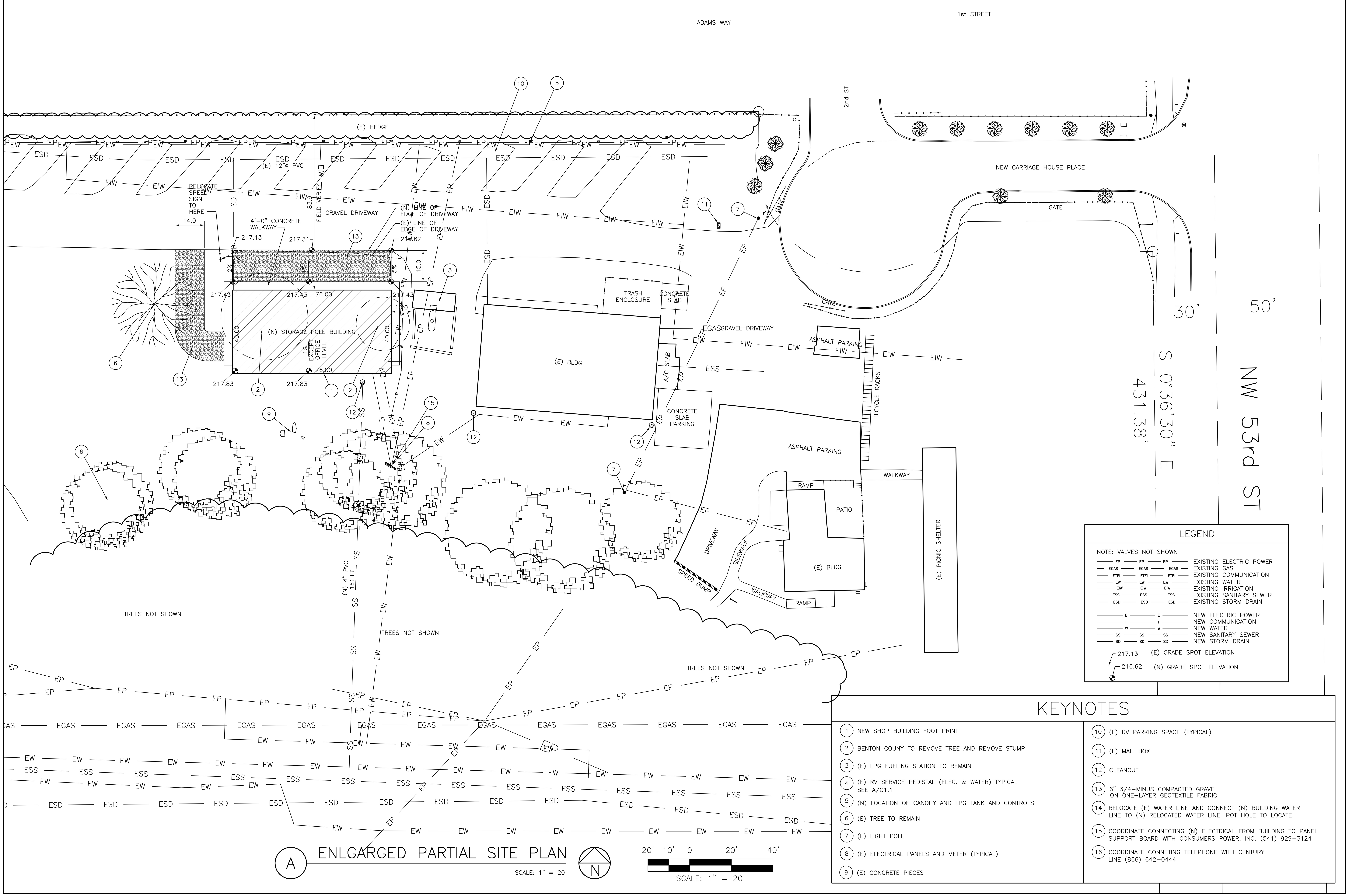
110 SW 53rd ST
CORVALLIS, OR 97333

SITE PLAN

PROFESSIONAL ENGINEER
16581
digitally signed
OREGON
JUL 20, 1993
WILLIAM E BARLOW
EXPIRES: 12/31/25

CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com

| | |
|---|---|
| DATE | 1.17.2024 |
| SCALE | AS SHOWN |
| DRAWN | WEB |
| SHEET | C1.0 |




## LEGEND

NOTE: VALVES NOT SHOWN

| | |
|---|---|
| EP | EXISTING ELECTRIC POWER |
| EGAS | EXISTING GAS |
| ETEL | EXISTING COMMUNICATION |
| EW | EXISTING WATER |
| EIW | EXISTING IRRIGATION |
| ESS | EXISTING SANITARY SEWER |
| ESD | EXISTING STORM DRAIN |
| E | NEW ELECTRIC POWER |
| T | NEW COMMUNICATION |
| W | NEW WATER |
| SS | NEW SANITARY SEWER |
| SD | NEW STORM DRAIN |
| 217.13 | (E) GRADE SPOT ELEVATION |
| 216.62 | (N) GRADE SPOT ELEVATION |

## KEYNOTES

1. NEW SHOP BUILDING FOOT PRINT
2. BENTON COUNY TO REMOVE TREE AND REMOVE STUMP
3. (E) LPG FUELING STATION TO REMAIN
4. (E) RV SERVICE PEDISTAL (ELEC. & WATER) TYPICAL SEE A/C1.1
5. (N) LOCATION OF CANOPY AND LPG TANK AND CONTROLS
6. (E) TREE TO REMAIN
7. (E) LIGHT POLE
8. (E) ELECTRICAL PANELS AND METER (TYPICAL)
9. (E) CONCRETE PIECES
10. (E) RV PARKING SPACE (TYPICAL)
11. (E) MAIL BOX
12. CLEANOUT
13. 6" 3/4-MINUS COMPACTED GRAVEL ON ONE-LAYER GEOTEXTILE FABRIC
14. RELOCATE (E) WATER LINE AND CONNECT (N) BUILDING WATER LINE TO (N) RELOCATED WATER LINE. POT HOLE TO LOCATE.
15. COORDINATE CONNECTING (N) ELECTRICAL FROM BUILDING TO PANEL SUPPORT BOARD WITH CONSUMERS POWER, INC. (541) 929-3124
16. COORDINATE CONNETING TELEPHONE WITH CENTURY LINE (866) 642-0444

A ENLGARGED PARTIAL SITE PLAN

SCALE: 1" = 20'

20' 10' 0 20' 40'

SCALE: 1" = 20'

| REVISIONS | BY |
|---|---|

# A NEW STORAGE POLE BUILDING

110 SW 53rd ST
CORVALLIS, OR 97333

ENLARGED PATIAL SITE PLAN

PROFESSIONAL ENGINEER 16581 OREGON JUL 20, 1993 WILLIAM E BARLOW
digitally signed
EXPIRES: 12/31/25


CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com


| | |
|---|---|
| DATE | 1.17.2024 |
| SCALE | AS SHOWN |
| DRAWN | WEB |
| SHEET | C1.1 |

# STRUCTURAL AND GENERAL NOTES

## GENERAL

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE CONSTRUCITON. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES.

2. DO NOT SCALE DRAWINGS. COORDINATE DIMENSIONS WITH "S" DESIGN DRAWINGS. COORDINATE CONSTRUCTION WITH ALL TRADES.

3. ALL WORK SHALL CONFORM TO THE MINIMUM STANDARDS OF THE 2014 OREGON STRUCTURAL SPECIALTY CODE AS AMENDED AND ADOPTED BY THE STATE OF OREGON,

4. METHODS, PROCEDURES, AND SEQUENCES OF CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO MAINTAIN AND ENSURE THE INTEGRITY OF THE STRUCTURE AT ALL STAGES OF CONSTRUCTION.

5. THE STRUCTURAL DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCITON. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE, WORKERS, AND VISITORS DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT LIMITED TO BRACING, SHORING FOR CONSTRUCTION LOADS, ETC. VISITS TO THE SITE BY THE PROJECT ENGINEER OR HIS AGENT OR REPRESENTATIVE, SHALL NOT INCLUDE REVIEW OF THE ABOVE ITEMS.

6. OPENINGS, POCKETS, ETC. SHALL NOT BE PLACED IN STRUCTURAL ELEMENTS UNLESS SPECIFICALLY DETAILED OR APPROVED BY THE PROJECT ENGINEER WHOSE NAME AND SEAL (STAMP) APPEAR ON THESE STRUCTURAL DRAWINGS.

7. CONSTRUCTION LOAD (MATERIAL AND EQUIPMENT) SHALL NOT EXCEED THE DESIGN LIVE LOAD PER SQUARE FOOT. PROVIDE ADEQUATE SHORING AND/OR BRACING WHERE THE STRUCTURE HAS NOT ATTAINED DESIGN STRENGTH.

8, WHEN A DETAIL IS IDENTIFIED AS TYPICAL, THE CONTRACTOR SHALL APPLY THIS DETAIL IN ESTIMATING AND CONSTRUCTION TO EVERY LIKE CONDITION WHETHER OR NOT THE REFERENCE IS MADE IN EVERY INSTANCE.

## MECHANICAL

1. MECHANICAL DESIGN AND MATERIAL BY OTHERS.

## ELECTRICAL

1. ELECTRICAL DESIGN AND MATERIAL BY OTHERS.

## FOUNDATION

1. FOUNDATION SOIL BEARING PRESSURE ASSUMED TO BE 1500 PSI.

2. THE CONTRACTOR SHALL PROVIDE FOR DE-WATERING OF EXCAVATIONS FOR EITHER SURFACE, GROUND, OR SEEPAGE WATER.

3. ANY ABANDONED MATERIALS, FOOTINGS, UTILITIES, ETC., THAT INTERFERE WITH NEW CONSTRUCTION SHALL BE REMOVED.

4. THE CONTRACTOR SHALL PROVIDE FOR DESIGN AND INSTALLATION OF ALL CRIBBING, SHEATHING, AND SHORING REQUIRED TO SAFELY RETAIN THE EARTH BANKS.

## NAILS

1. NAILS INTO TREATED WOOD SHALL BE HOT DIPPED GALVANIZED.

## WOOD POSTS

1. PRESSURE TREATED (PT) POSTS, DF-L NO. 2 OR BETTER
   TREATED WOOD OPTIONS
   1.1 MICRONIZED COPPER AZOLE
   1.2 CHROMATED COPPER ARSENATE (VERIFY)
   1.3 COPPER AZOLE
   1.4 OTHER APPROVED BY PROJECT ENGINEER

## WEATHER PROTECTION

1. FLASHING SHALL BE INSTALLED IN SUCH A MANNER SO AS TO PREVENT MOISTURE ENTERING THE WALLS AND ROOF THROUGH JOINTS IN COPINGS, THROUGH MOISTURE PERMEABLE MATERIALS, AND AT VERTICAL WALLS AND ROOF INTERSECTIONS AND OTHER PENETRATIONS THROUGH THE WALL AND ROOF PLANES.

2. METAL FLASHING SHALL BE CORROSION RESISTANT WITH A THICKNESS OF NOT LESS THAN 0.019 INCHES.

3. CORROSION-RESISTIVE FLASHING SHALL BE PROVIDED IN THE EXTERIOR WALL ENVELOPE IN SUCH A MANNER AS TO PREVENT ENTRY OF WATER INTO THE WALL OR PENETRATIONS OF WATER TO THE BUILDING STRUCTURAL FRAMING COMPONENTS. THE FLASHING SHALL EXTEND TO THE SURFACE OF THE EXTERIOR WALL FINISH AND SHALL BE INSTALL TO PREVENT WATER FROM REENTERING THE EXTERIOR WALL ENVELOPE.

## CONCRETE AND REINFORCEMENT

1. CONCRETE MIXES SHALL BE DESIGNED BY A QUALIFIED TESTING LABRATORY AND REVIEWD BY THE PROJECT ENGINEER. MAXIMUM COARSE AGGREGATE SIZE IS 3/4 INCH. MIX DESIGNS SHALL BE SIGNED BY AN ENGINEER LICENSED IN THE STATE OF THE OREGON.

2. AGGREGATE FOR NORMAL WEIGHT CONCRETE SHALL CONFORM TO ASTM C33. PORTLAND CEMENT SHALL BE TYPE I OR TYPE II AND SHALL CONFORM TO ASTM C150.

3. ADMIXTURES MAY BE USED WITH PRIOR APPROVAL OF THE PROJECT ENGINEER. ADMIXTURES USED TO INCREASE THE WORKABILITY OF THE CONCRETE SHALL NOT BE CONSIDERED TO REDUCE THE SPECIFIED MINIMUM CEMENT CONTENT. CALCIUM CHLORIDE SHALL NOT BE USED.

4. COMPRESSIVE STRENGTHS OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS:
   4.1 FOOTINGS . . . . . . . . . . . . . . . . . . . . 3000 PSI
   4.2 BUILDING SLAB . . . . . . . . . . . . . . . . 4000 PSI

5. MIXING, TRANSPORTING, AND PLACING OF CONCRETE SHALL CONFORM TO ACI 304R. ALL CONCRETE SURFACES AGAINST WHICH CONCRETE IS TO BE PLACED SHALL BE THOROUGHLY CLEANED. LAITANCE AND STANDING WATER SHALL BE REMOVED.

6. ALL REINFORCING BARS, ANCHOR BOLTS, AND OTHER CONCRETE CONNCECTORS SHALL BE WELL SECURED IN POSITION PRIOR TO PLACING CONCRETE. PROVIDE CONCRETE PROTECTION AS REQUIRED AND NECESSARY.

7. BAR SUPPORTS FOR FLOOR SLAB
   7.1 REINFORCEMENT SHALL BE SUPPORTED AND RIGIDLY FASTENED BEFORE CONCRETE IS PLACED.
   7.2 BAR SUPPORTS MAY BE METAL, CONCRETE, FIBER-REINFORCED CONCRETE, PLASTIC, OR OTHER APPORVED MATERIAL..
   7.3 CLASS 3 BAR SUPPORTS MINIMUM

8. CONCRETE COVER PROTECTION FOR REINFORCEMENT BAR SHALL BE AS FOLLOWS: (SEE ACI 318-99 FOR CONDITIONS NOT NOTED.)
   8.1 CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH . . . . . . 3"
   8.2 CONCRETE EXPOSED TO EARTH OR WEATHER . . . . . . . . . . . . . . . . . . . . 1 1/2"

9. REINFORCING STEEL (REBAR) FOR CONCRETE SHALL BE DEFORMED, GRADE 60 (fy=60000 PSI YEILD STRENGTH)

11. DETAILING OF CONCRETE REINFORCEMENT BARS AND ACCESSORIES SHALL CONFORM TO THE RECOMMENDATIONS OF THE AMERICAN CONCRETE INSTITUTE (ACI) DETAILING MANUAL, ACI COMMITTEE 315.

12. GROUT SHALL BE NON-SHINKABLE GROUT CONFORMING TO ASTM C827 AND SHALL HAVE A SPECIFIED COMPRESSIVE STRENGTH AT 28 DAYS OF 5000 psi. PREGROUTING OF BASE PLATES WILL NO BE PERMITTED.

13. PROVIDE SLEEVES FOR PLUMBING AND ELECTRICAL OPENINGS IN CONCRETE BEFORE PLACING. CORING IN CONCRETE IS NOT PERMITTED EXCEPT AS SHOWN. NOTIFY THE PROJECT ENGINEER IN ADVANCE OF CONDITIONS NOT SHOWN ON THE DRAWINGS.

14. STEEL WELDED WIRE FABRIC (WWF)
   14.1 ASTM A185, PLAIN TYPE IN ROLLS, PLAN FINISH. PROVIDE 6"x6"-W2.1xW2.1 WWF, GRADE 65 MIN. (65000 PSI YIELD)

15. BAR AND WELDED WIRE FABRIC SUPPORTS
   15.1 PROVIDE ALL SPACERS, CHAIRS (HCM), TIES AND OTHER DEVICES NECESSARY TO PLACE, SPACE, SUPPORT AND MAINTAIN REBAR AND WWF IN LOCATIONS IN ACCORDANCE WITH ACI 315.
   15.2 CONFORM TO "BAR SUPPORT SPECIFICATION," CRSI MANUAL OF STANDARD PRACTICE, CHAPTER 3, LATEST EDITION, AND BE OF THE FOLLOWING TYPES:
      15.2.1 SUPPORT REINFORCING IN FOOTINGS WITH PRECAST CONCRETE BLOCKS.
      15.2.2 SUPPORT FOR WWF IN SLABS WITH PRECAST CONCRETE BLOCKS OR METAL CHAIRS OF ACI TYPE HCM, CLASS 3.

## STEEL ROOFING & SIDING

1A. BRUCE & DANA, INC.
2204 SIMPSON ST., S.E.
SALEM, OR 97301
503-364-5274
800-653-5144

OR

1B. LEGACY METALWORKS
795 S. 2ND ST., HARRISBURG, OR 97446
541-632-4260

OR

1C. OTHER SUPPLIER/MANUFACTURER APPROVED BY PROJECT ENGINEER OR APPROVED BY OWNER

2. PROVIDE VAPOR BARRIER BETWEEN THE METAL CLADDING (SIDING) AND THE WOOD SUPPORTS, SUCH AS 15# FELT. INSTALL VAPOR BARRIER PER MANUFACTUER'S INSTRUCTIONS.

## WOOD TRUSSES

RELCO ROOF & FLOOR INC
30153 SUBSTATION DR
HARRISBURG, OR 97446
(541) 995-6311

1.01 WORK INCLUDED
   1. FABRICATE, SUPPLY AND ERECT WOOD TRUSSES AS SHOWN ON THE DRAWINGS AND AS SPECIFIED. WORK TO INCLUDE ANCHORAGE, BLOCKING, CURBING, MISCELLANEOUS FRAMING AND BRACING.

1.02 DEFINITIONS
   A. TRUSS: THE TERMS "TRUSS" AND "WOOD TRUSS COMPONENT" REFER TO OPEN WEB LOAD CARRYING ASSEMBLIES SUITABLE FOR SUPPORT OF ROOF DECKS OR FLOORS IN BUILDINGS.
   B. MANUFACTURER: A MANUFACTURER WHO IS REGULARLY ENGAGED IN DESIGN AND FABRICATION OF WOOD TRUSS COMPONENTS.
   C. TRUSS INSTALLER: BUILDER, CONTRACTOR OR SUB-CONTRACTOR WHO IS RESPONSIBLE FOR THE FIELD STORAGE, HANDLING AND INSTALLATION OF TRUSSES.

1.03 TRUSS DESIGN
   A. TRUSSES SHALL BE DESIGNED IN ACCORDANCE WITH THESE SPECIFICATIONS AND WHERE ANY APPLICABLE DESIGN FEATURE IS NOT SPECIFIED HEREIN, DESIGN SHALL BE IN ACCORDANCE WITH APPLICABLE PROVISIONS OF LATEST EDITION OF NATIONAL DESIGN SPECIFICATIONS FOR WOOD CONSTRUCTION (NDS) AMERICAN FOREST AND PAPER ASSOCIATION (AFPA), AND DESIGN SPECIFICATIONS FOR METAL PLATE CONNECTED WOOD TRUSSES (ANSI/TPI 1), TRUSS PLATE INSTITUTE (TPI), AND CODE OF JURISDICTION.
   B. MANUFACTURER SHALL FURNISH DESIGN DRAWINGS BEARING SEAL AND REGISTRATION NUMBER OF A CIVIL OR STRUCTURAL ENGINEER LICENSED IN STATE WHERE TRUSSES ARE TO BE INSTALLED. DRAWINGS SHALL BE APPROVED BY ARCHITECT PRIOR TO FABRICATION.
   C. TRUSS DESIGN DRAWINGS SHALL INCLUDE AS MINIMUM INFORMATION:
   1. SPAN, DEPTH OR SLOPE AND SPACING OF TRUSSES;
   2. REQUIRED BEARING WIDTH;
   3. DESIGN LOADS, AS APPLICABLE: A. TOP CHORD LIVE LOAD;
      B. TOP CHORD DEAD LOAD;
      C. BOTTOM CHORD LIVE LOAD;
      D. BOTTOM CHORD DEAD LOAD;
      E. CONCENTRATED LOADS AND THEIR POINTS OF APPLICATION; AND
      F. WIND AND SEISMIC CRITERIA;
   4. ADJUSTMENT TO LUMBER AND PLATE DESIGN LOADS FOR CONDITION OF USE;
   5. REACTIVE FORCES, THEIR POINTS OF OCCURRENCE AND DIRECTION;
   6. ALPINE/LUMBERMATE/CLARY PLATE TYPE, GAGE, SIZE AND LOCATION OF PLATE AT EACH JOINT;
   7. LUMBER SIZE, SPECIES AND GRADE FOR EACH MEMBER;
   8. LOCATION OF ANY REQUIRED CONTINUOUS LATER BRACING;
   9. CALCULATED DEFLECTION RATIO AND/OR MAXIMUM DEFLECTION FOR LIVE AND TOTAL LOAD;
   10. MAXIMUM AXIAL COMPRESSIVE FORCES IN TRUSS MEMBERS;
   11. LOCATION OF JOINTS;
   12. CONNECTION REQUIREMENTS FOR:
      A. TRUSS TO TRUSS GIRDERS;
      B. TRUSS PLY TO PLY; AND
      C. FIELD SPLICES.

2.01 MATERIALS
   A. LUMBER:
   1. LUMBER USED FOR TRUSS MEMBERS SHALL BE IN ACCORDANCE WITH PUBLISHED VALUES OF LUMBER RULES WRITING AGENCIES APPROVED BY BOARD OF REVIEW OF AMERICAN LUMBER STANDARDS COMMITTEE. LUMBER SHALL BE IDENTIFIED BY GRADE MARK OF A LUMBER INSPECTION BUREAU OR AGENCY APPROVED BY THAT BOARD, AND SHALL BE AS SHOWN ON DESIGN DRAWINGS.
   2. MOISTURE CONTENT OF LUMBER SHALL BE NO LESS THAN 7 PERCENT NOR GREATER THAN 19 PERCENT AT TIME OF FABRICATION.
   3. ADJUSTMENT OF VALUES FOR DURATION OF LOAD OR CONDITIONS OF USE SHALL BE IN ACCORDANCE WITH NATIONAL DESIGN SPECIFICATIONS FOR WOOD CONSTRUCTION (NDS).
   4. FIRE RETARDANT TREATED LUMBER, IF APPLICABLE, SHALL MEET SPECIFICATIONS OF TRUSS DESIGN AND ANSI/TPI 1-1995, PAR 9.1.5 AND SHALL BE RE-DRIED AFTER TREATMENT IN ACCORDANCE WITH AWPA STANDARD C20. ALLOWABLE VALUES MUST BE ADJUSTED IN ACCORDANCE WITH NDS PAR 2.3.6. LUMBER TREATER SHALL SUPPLY CERTIFICATE OF COMPLIANCE.

B. METAL CONNECTOR PLATES:
   1. METAL CONNECTOR PLATES SHALL BE MANUFACTURED BY ALPINE/LUMBERMATE/CLARY OR PROJECT ENGINEER APPROVED METAL CONNECTOR AND SHALL BE NOT LESS THAN .036 INCHES IN THICKNESS (20 GAGE) AND SHALL MEET OR EXCEED ASTM A653-94 GRADE 37, AND SHALL BE HOT DIPPED GALVANIZED ACCORDING TO ASTM A653-94, COATING DESIGNATION G60. WORKING STRESSES IN STEEL ARE TO BE APPLIED TO EFFECTIVE RATIOS FOR PLATES AS DETERMINED BY TEST IN ACCORDANCE WITH APPENDIX E AND F OF ANSI/TPI 1-1995.
   2. IN HIGHLY CORROSIVE ENVIRONMENTS, SPECIAL APPLIED COATINGS OR STAINLESS STEEL MAY BE REQUIRED.
   3. AT THE REQUEST OF ARCHITECT, ALPINE/LUMBERMATE/CLARY SHALL FURNISH A CERTIFIED RECORD THAT MATERIALS COMPLY WITH STEEL SPECIFICATIONS.

2.02 TRUSS FABRICATION
   1. TRUSSES SHALL BE FABRICATED IN A PROPERLY EQUIPPED MANUFACTURING FACILITY OF A PERMANENT NATURE. TRUSSES SHALL BE MANUFACTURED BY EXPERIENCED WORKMEN, USING PRECISION CUTTING, JIGGING AND PRESSING EQUIPMENT MEETING REQUIREMENTS OF ANSI/TPI 1-1995, SECTION 4. TRUSS MEMBERS SHALL BE ACCURATELY CUT TO LENGTH ANGLE AND TRUE TO LINE TO ASSURE PROPER FITTING JOINTS WITHIN TOLERANCES SET FORTH IN ANSI/TPI 1-1995, SECTION 4, AND PROPER FIT WITH OTHER WORK.

3.01 HANDLING, INSTALLATION AND BRACING OF ROOF AND FLOOR TRUSSES
   1. TRUSS DELIVERY SHALL BE SCHEDULED REASONABLY NEAR THE SCHEDULED TIME OF ERECTION.
   2. TRUSSES SHALL BE HANDLED DURING FABRICATION, DELIVERY AND AT JOB SITE SO AS NOT TO BE SUBJECTED TO EXCESSIVE BENDING.
   3. TRUSSES SHALL BE UNLOADED ON SMOOTH GROUND TO AVOID LATERAL STRAIN. TRUSSES SHALL BE PROTECTED FROM DAMAGE THAT MIGHT RESULT FROM ON-SITE ACTIVITIES AND ENVIRONMENTAL CONDITIONS. PREVENT TOPPLING WHEN BANDING IS REMOVED.
   4. UPON ARRIVAL AND DURING THE UNLOADING PROCESS, TRUSSES SHALL BE INSPECTED FOR DAMAGE.
   5. HANDLE DURING INSTALLATION IN ACCORDANCE WITH HANDLING, INSTALLING AND BRACING WOOD TRUSSES (HIB-91), TPI, AND ANSI/TPI 1-1995. INSTALLATION SHALL BE CONSISTENT WITH GOOD WORKMANSHIP AND GOOD BUILDING PRACTICES AND SHALL BE RESPONSIBILITY OF TRUSS INSTALLER.
   6. APPARENT DAMAGE TO TRUSSES, IF ANY, SHALL BE REPORTED TO MANUFACTURER PRIOR TO INSTALLATION.
   7. TRUSSES SHALL BE SET AND SECURED LEVEL AND PLUMB, AND IN CORRECT LOCATION. TRUSSES SHALL BE HELD IN CORRECT ALIGNMENT UNTIL SPECIFIED PERMANENT BRACING IS INSTALLED.
   8. CUTTING AND ALTERING OF TRUSSES IS NOT PERMITTED.
   9. CONCENTRATED LOADS SHALL NOT BE PLACED ATOP TRUSSES UNTIL ALL SPECIFIED BRACING HAS BEEN INSTALLED AND DECKING IS PERMANENTLY NAILED IN PLACE. SPECIFICALLY AVOID STACKING FULL BUNDLES OF DECKING OR OTHER HEAVY MATERIALS ONTO UNSHEATHED TRUSSES.
   10. ERECTION BRACING IS ALWAYS REQUIRED. PROFESSIONAL ADVICE SHOULD ALWAYS BE SOUGHT TO PREVENT TOPPLING OR "DOMINOING" (CASCADING COLLAPSE) OF TRUSSES DURING INSTALLATION.
   11. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND FURNISHING THE MATERIALS USED FOR INSTALLATION AND PERMANENT BRACING.

## ABBREVIATIONS

| | | | |
|---|---|---|---|
| (N) | NEW | UNO | UNLESS NOTED OTHERWISE |
| (E) | EXISTING | PT | PRESSURE TREATED |
| DO | DITTO (SAME) | CONC. | CONCRETE |
| TPI | TRUSS PLATE INSTITUTE (tpinst.org) | TYP. | TYPICAL |
| OH | OVER HANG (EAVE) | MB | MACHINE BOLT |
| | | STD. | STANDARD |

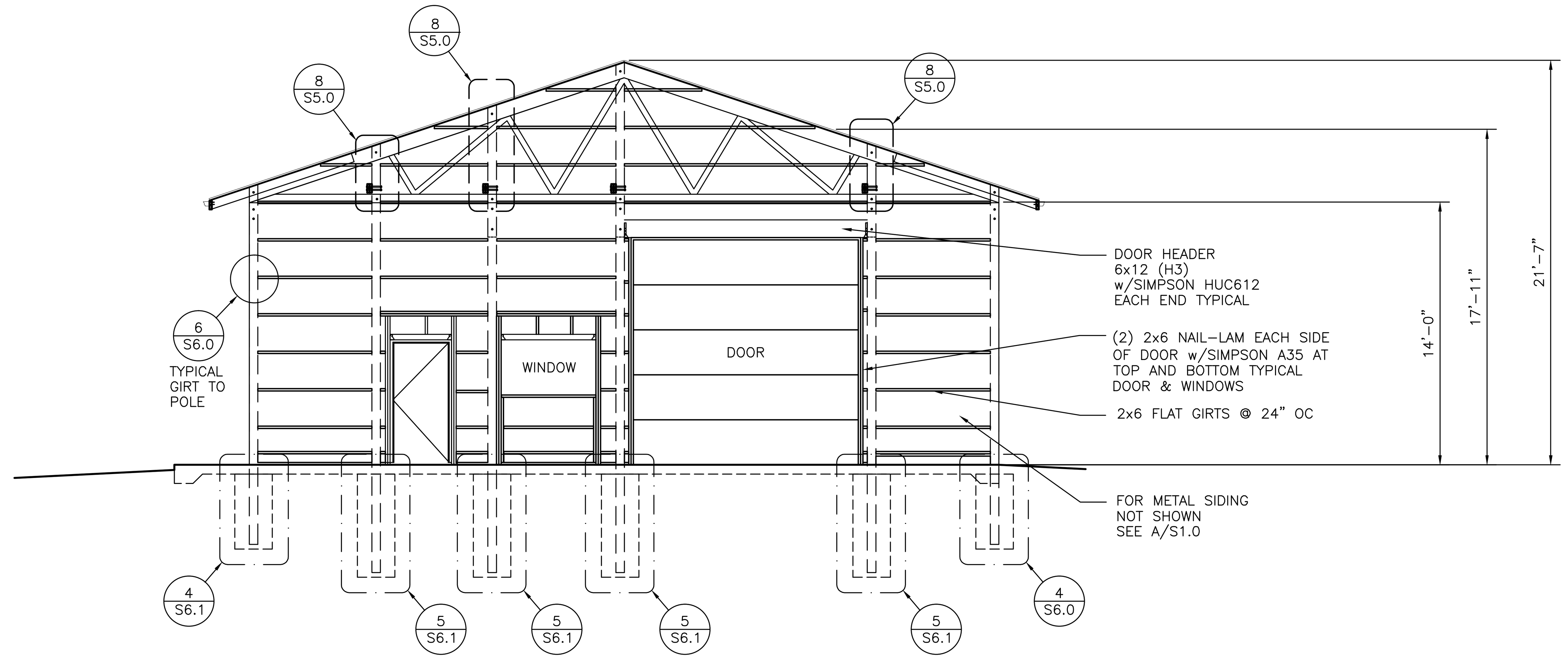
REVISIONS | BY

A NEW STORAGE POLE BUILDING
110 SW 53rd ST
CORVALLIS, OR 97333
STRUCTRUAL AND GENTERAL NOTES

PROFESSIONAL ENGINEER
16581
digitally signed
OREGON
JULY 20, 1993
WILLIAM E BARLOW
EXPIRES: 12/31/25

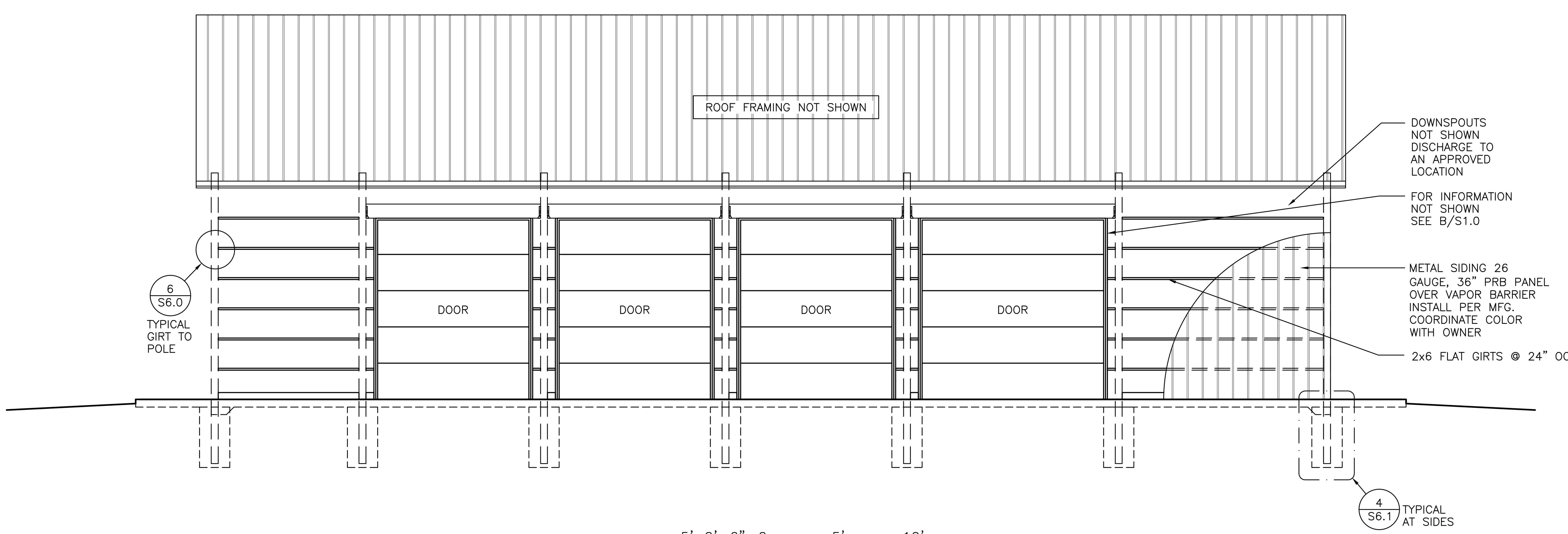
CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com

DATE 1.17.2024
SCALE AS SHOWN
DRAWN WEB
SHEET
N1.0




B WEST ELEVATION

SCALE: 3/16"=1'-0"




5' 2'-6" 0 5' 10'

SCALE: 3/16"=1'-0"

A NORTH ELEVATION

SCALE: 3/16"=1'-0"

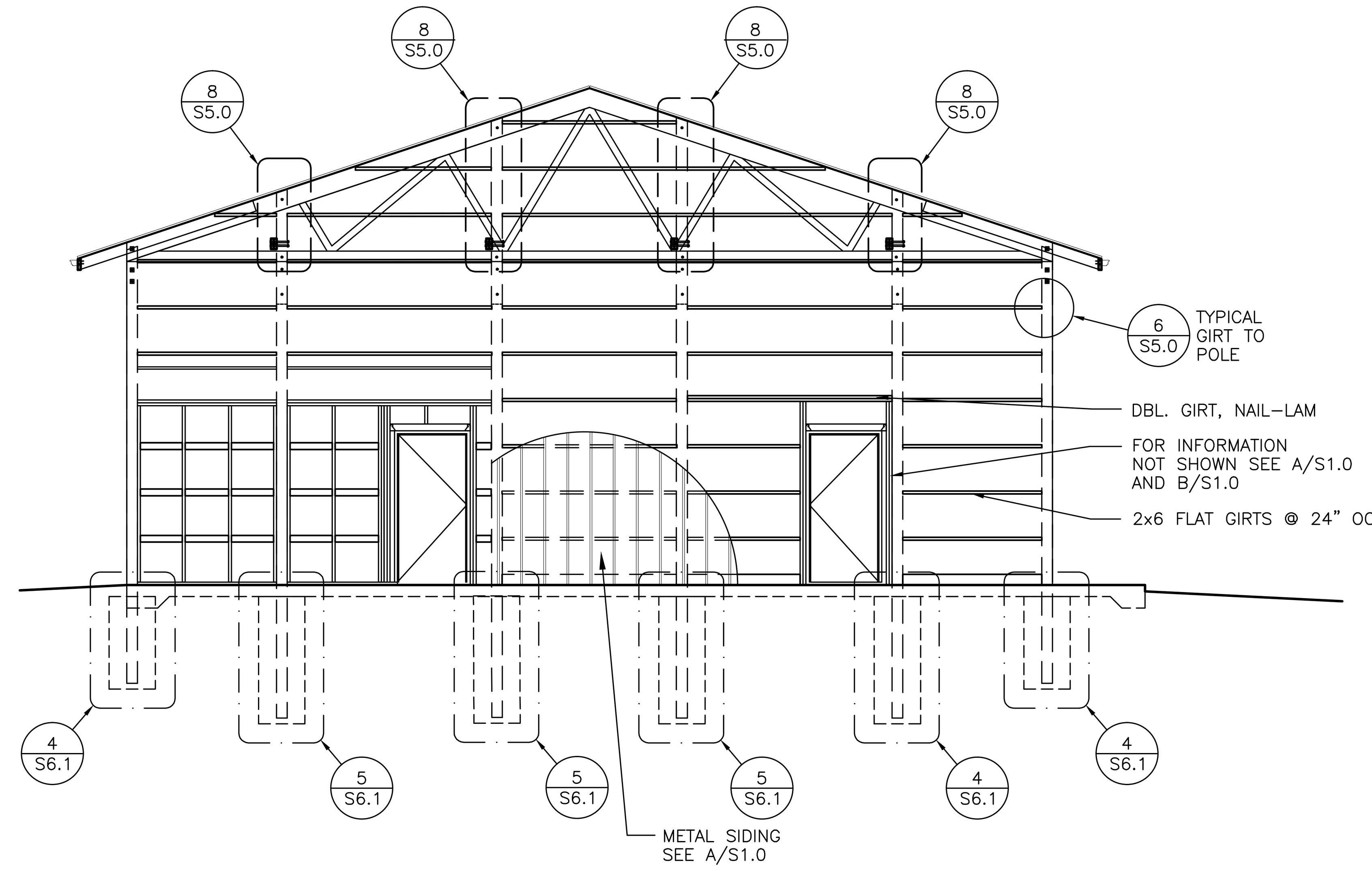
| REVISIONS | BY |
|---|---|
| | |
| | |
| | |
| | |
| | |

# A NEW STORAGE POLE BUILDING
110 SW 53rd ST
CORVALLIS, OR 97333
NORTH AND WEST ELEVATIONS

PROFESSIONAL ENGINEER 16581 digitally signed OREGON JUL 20, 1993 WILLIAM E BARLOW
EXPIRES: 12/31/25

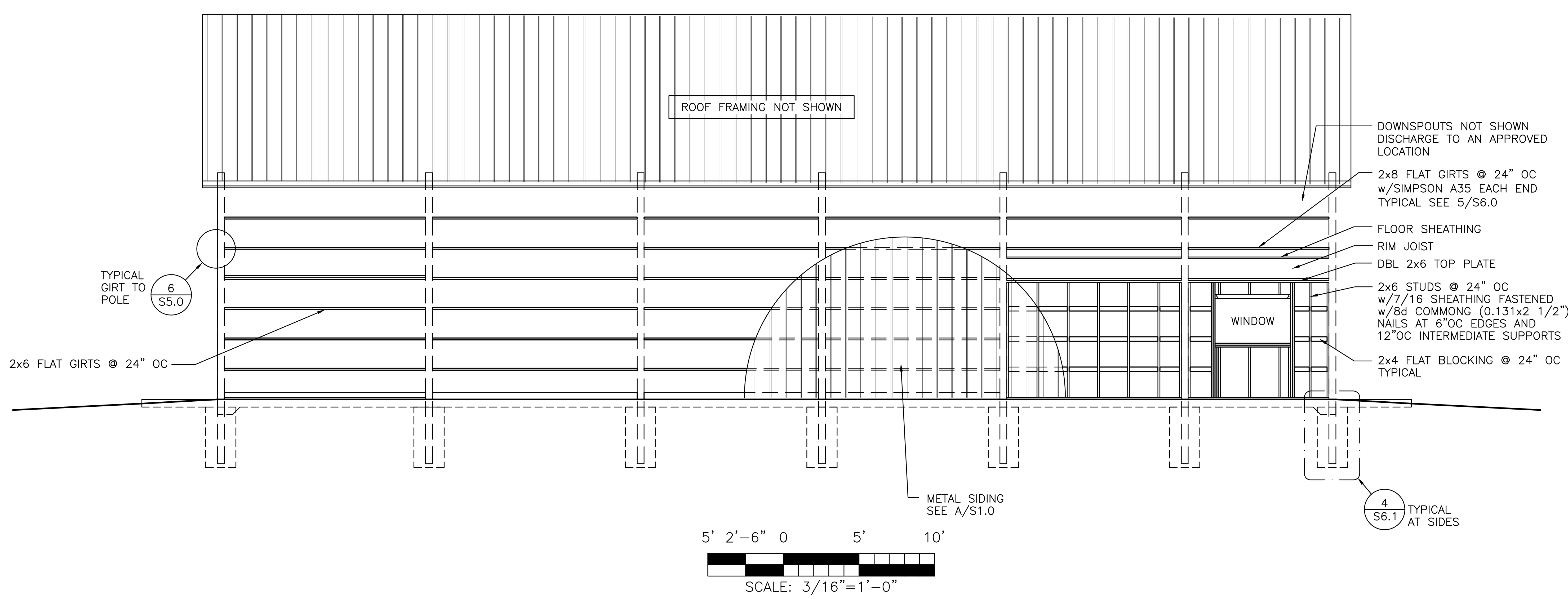
CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com

DATE 1.17.2024
SCALE AS SHOWN
DRAWN WEB
SHEET S1.0




B EAST ELEVATION

SCALE: 3/16"=1'-0"




A SOUTH ELEVATION

SCALE: 3/16"=1'-0"

| REVISIONS | BY |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |

# A NEW STORAGE POLE BUILDING

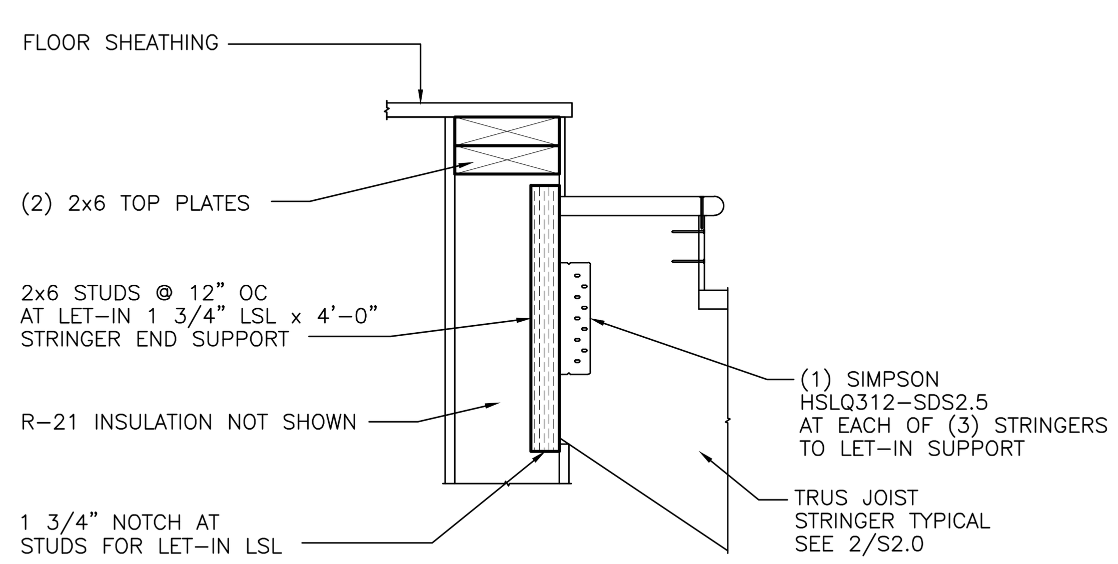
110 SW 53rd ST
CORVALLIS, OR 97333

SOUTH AND EAST ELEVATIONS

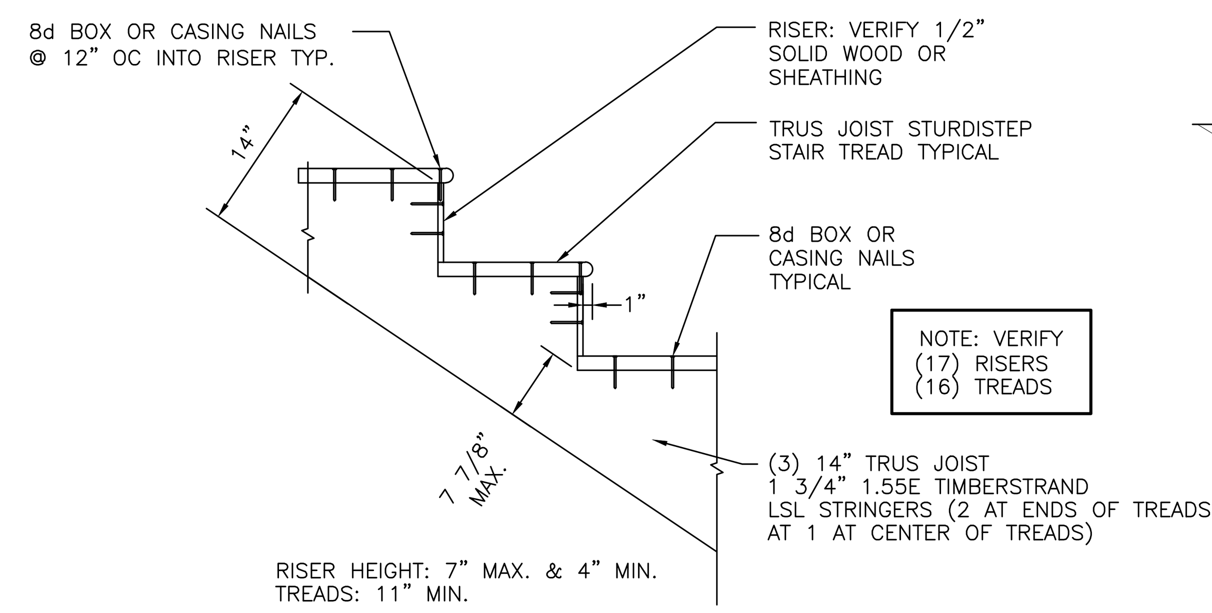
PROFESSIONAL ENGINEER
16581
digitally signed
OREGON
JUL 20, 1993
WILLIAM E BARLOW
EXPIRES: 12/31/25

CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com

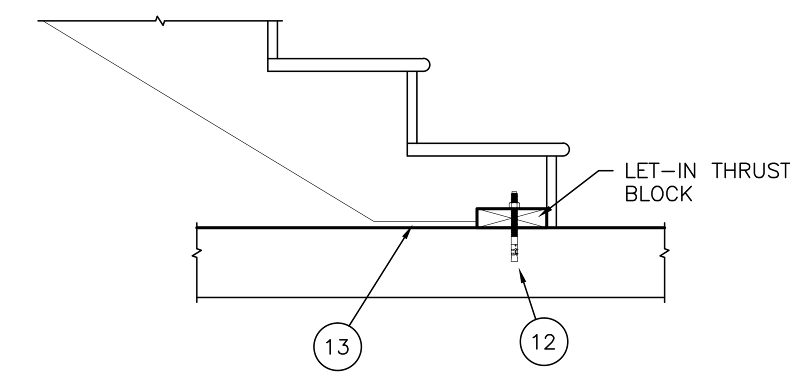
| | |
|---|---|
| DATE | 1.17.2024 |
| SCALE | AS SHOWN |
| DRAWN | WEB |
| SHEET | S1.1 |




3 DETAIL
NOT TO SCALE



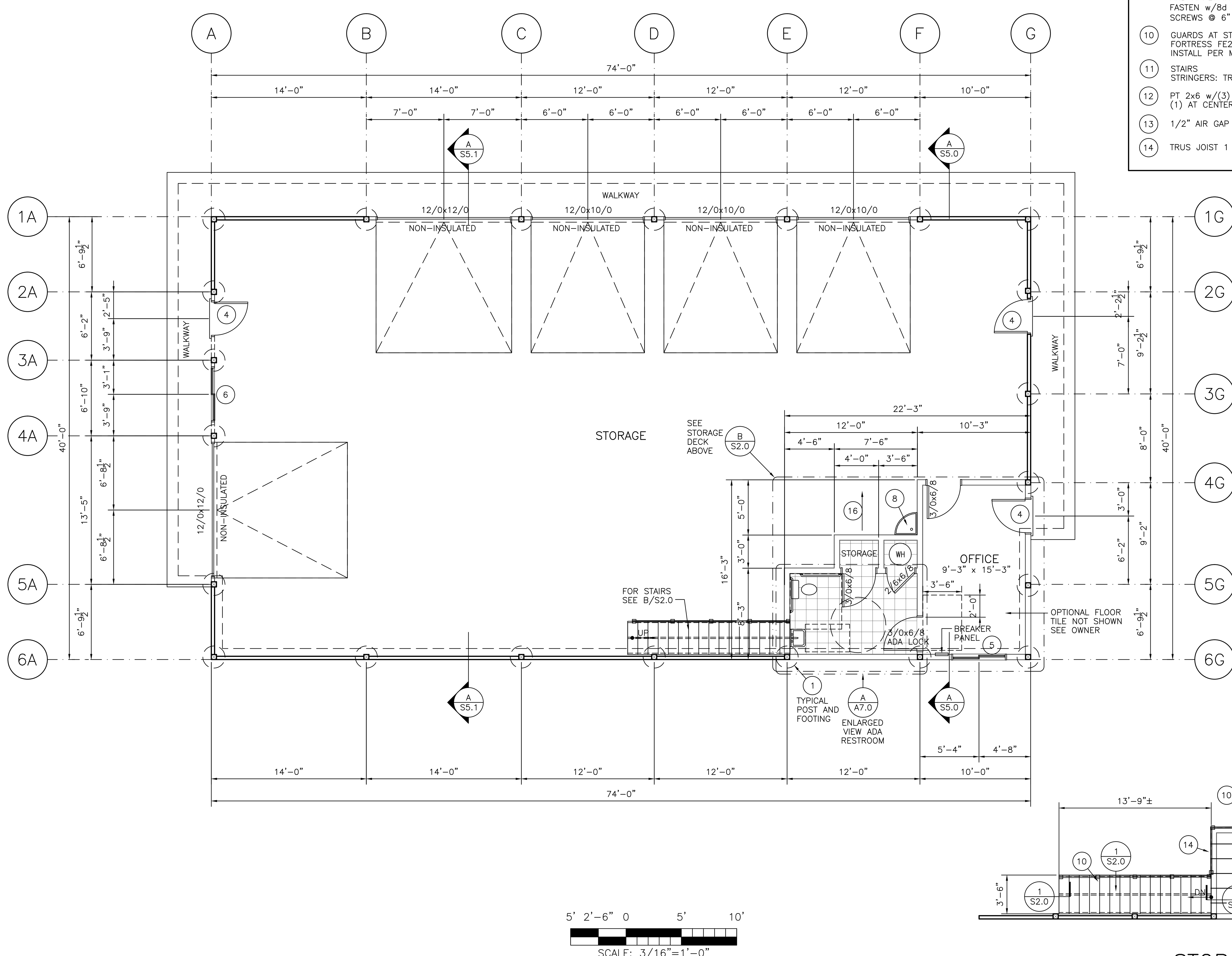

2 DETAIL
NOT TO SCALE



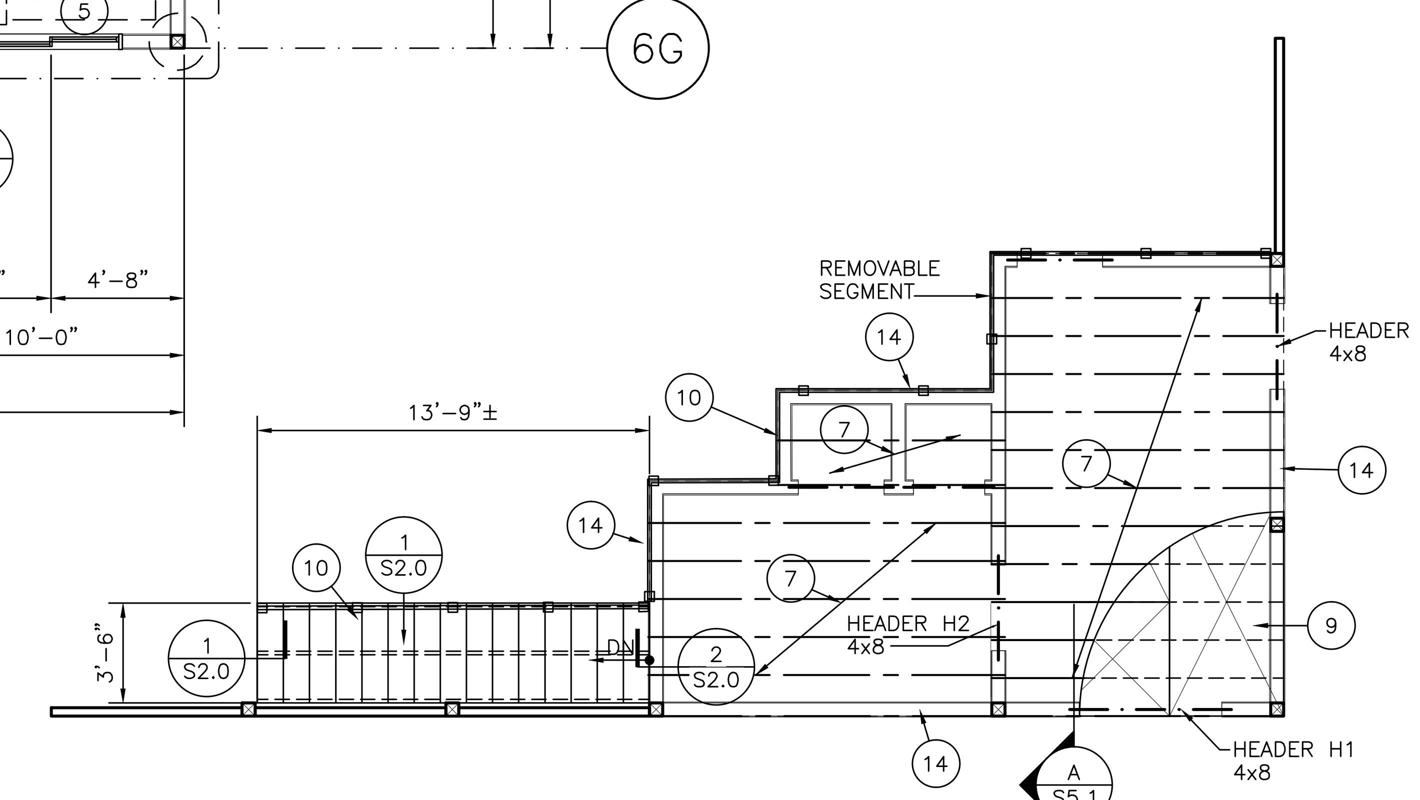

1 DETAIL
NOT TO SCALE

## KEY NOTES

1. P.T. 6x6 POST, EMBEDDED IN 2'ø48" DEEP FOOTING w/REBAR CAGE SEE 1/S6.0
2. FOR CONCRETE SLAB, SEE FOUNDATION PLAN, A/S3.0
3. P.T. 2x6 SKIRT BOARD ON EDGE SEE 1/S4.0
4. COMMERCIAL STEEL DOOR 3/0x6/8 PREHUNG w/HARDWARE SCHLAGE COMMERCIAL KEYED ALIKE ENTRY DOOR KNOB, EXTERIOR LEVER HANDLE INSIDE
5. 5'-0"x3'-0" VINYL SLIDING WINDOW
6. 5'-0"x3'-0" VINYL SLIDING WINDOW TEMPERED GLASS
7. I-JOIST iLEVEL TRUS JOIST TJI 110x16" @ 16" OC FULL-DEPTH TJI BLOCKING EACH END OF JOISTS TYPICAL
8. FLOOR MOP SINK
9. 1 1/8" T&G APA RATED STURD-I-FLOOR APPLY ONLY ADHESIVES CONFORMING TO APA SPECIFICATION AFG-01 OR ASTM D3498 AND APPLY IN ACCORDANCE WITH THE ADHESIVE MANUFACTURER'S INSTRUCTIONS. FASTEN w/8d COMMON (2 1/2"x0.131") NAILS OR SIMPSON 2 1/2" HCKWSV212S SCREWS @ 6" OC EDGES AND 12" OC INTERMEDIATE SUPPORTS
10. GUARDS AT STAIRS AND STORAGE DECK FORTRESS FE26 PLUS STEEL RAILING TYPICAL INSTALL PER MANUFACTUER'S INSTRUCTIONS
11. STAIRS STRINGERS: TRUS JOIST 1 3/4"x14" 1.55E TIMBERSTAND LSL
12. PT 2x6 w/(3) 1/2"ø x5 1/2" SIMPSON STRONG BOLTS (1) AT CENTER OF LET-IN THRUST BLOCKING & (1) 6" FROM EACH END
13. 1/2" AIR GAP
14. TRUS JOIST 1 1/8"x16" TJ RIM BOARD TYPICAL




A MAIN FLOOR PLAN
SCALE: 3/16"=1'-0"




B STORAGE DECK FLOOR FRAMING
SCALE: 3/16"=1'-0"

| REVISIONS | BY |
|---|---|
| | |

# A NEW STORAGE POLE BUILDING
110 SW 53rd ST
CORVALLIS, OR 97333

MAIN FLOOR PLAN AND STORAGE DECK AND DETAILS

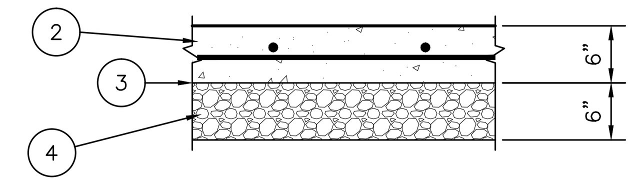
PROFESSIONAL ENGINEER 16581 digitally signed OREGON JUL 20, 1993 WILLIAM E BARLOW
EXPIRES: 12/31/25

CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com

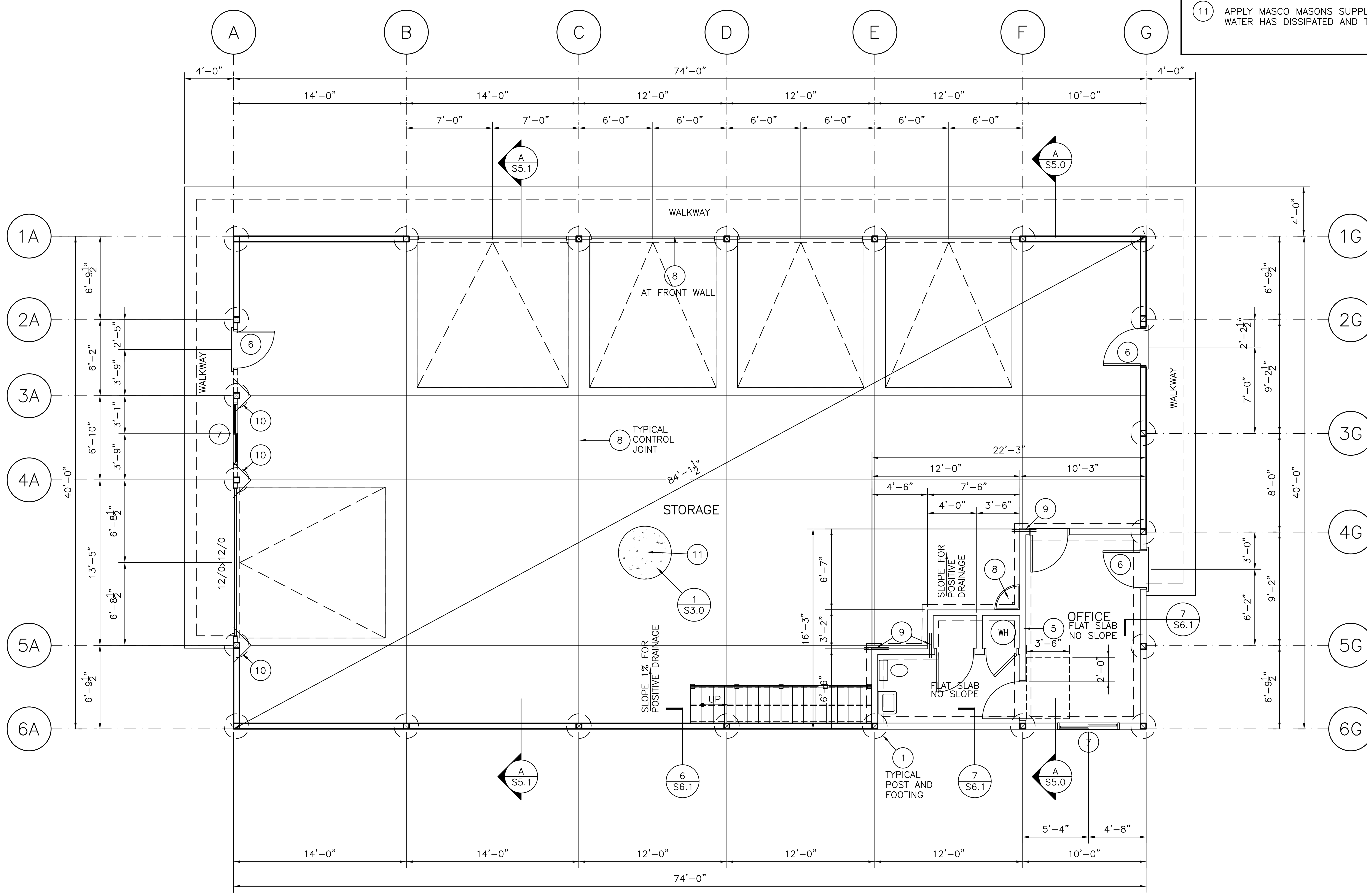
DATE 1.17.2024
SCALE AS SHOWN
DRAWN WEB
SHEET S2.0

# KEY NOTES

1. P.T. 6x6 POST, EMBEDDED IN 24"øx48" DEEP FOOTING w/REBAR CAGE SEE 1/S6.0
2. CONCRETE SLAB w/#3 REBAR @ 16" OC EACH WAY CENTERED IN SLAB ON CHAIRS OR WIRE DOBIES
3. 6-MIL BLACK POLYETHYLENE MOISTURE BARRIER
4. 3/4" COMPACTED GRAVEL (CRUSHED QUARRY ROCK)
5. INTERIOR WALL FOOTINGS CONSTRUCT 6" STEM WALL FOR CURB SEE 1/S6.1
6. 3/0x6/8 STEEL DOOR. KEYED ALIKE WITH OTHER EXTERIOR DOORS
7. 5/0x3/0 SLIDER. VINYL
8. CONTROL JOINTS SHALL BE FORMED BY SAW CUTTING, d=1.5"; BY TOOLING, R=1/8" EACH SIDE OR JOINT; A JOINT WITH A GROOVING TOOL, R=1/8"; OR BY INSERTING A PLASTIC STRIP INTO THE CONCRETE DURING FINISHING (ZIP-STRIP) d=1.5".
9. (2) #4x24" REBAR AT END OF CONTROL JOINT (NO CONTROL JOINTS THROUGH OFFICE AREA)
10. 24"x24" ISOLATION CONTROL JOINT
11. APPLY MASCO MASONS SUPPLY MASCO CURE & SEAL 1315 AS SOON AS THE SURFACE WATER HAS DISSIPATED AND THE CONCRETE HAS BEEN FINISHED.




1 DETAIL
NOT TO SCALE




5' 2'-6" 0 5' 10'
SCALE: 3/16"=1'-0"

A FOUNDATION PLAN
SCALE: 3/16"=1'-0"

N

| REVISIONS | BY |
|---|---|
| | |

# A NEW STORAGE POLE BUILDING
110 SW 53rd ST
CORVALLIS, OR 97333
FOUNDATION PLAN

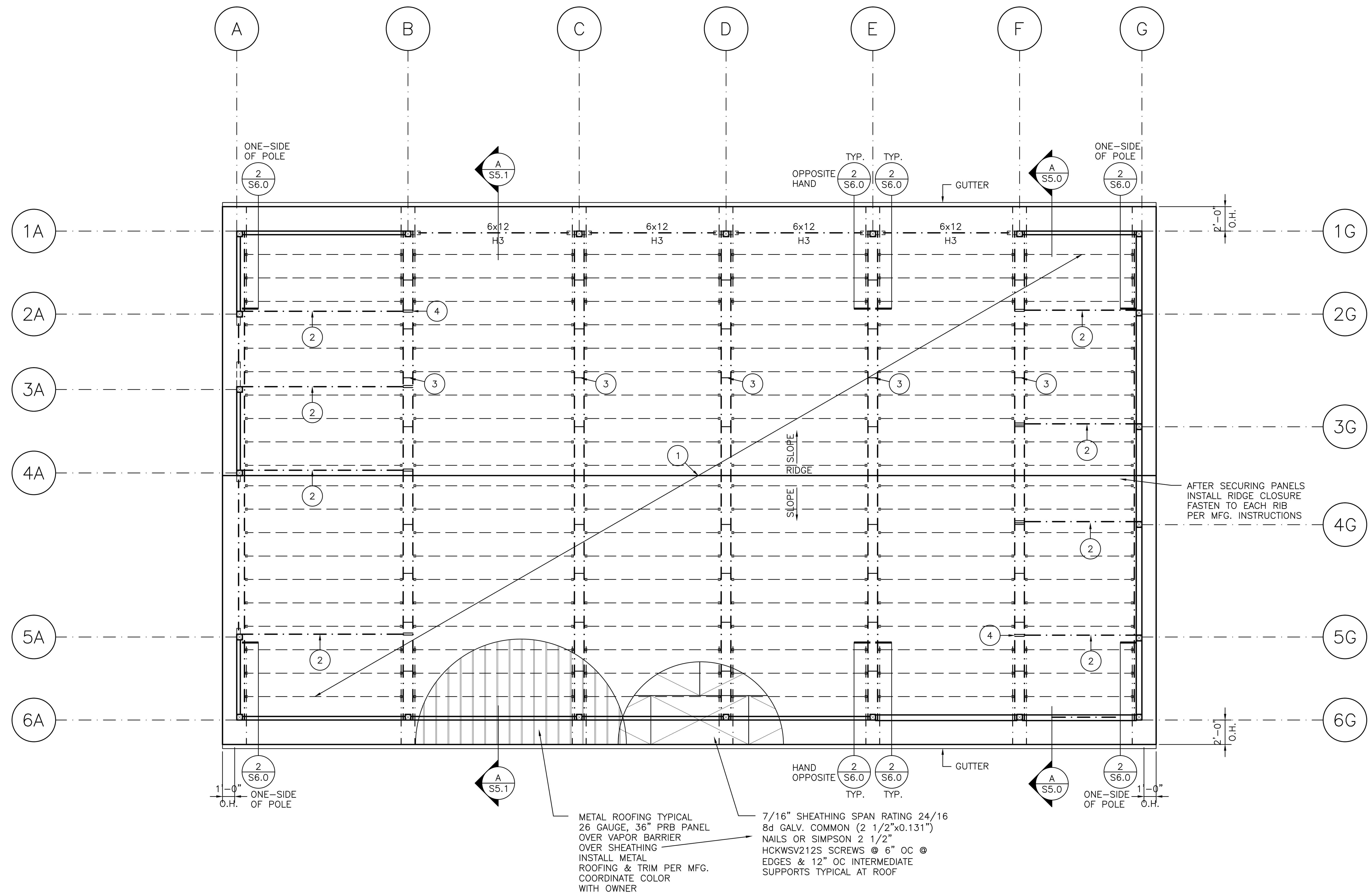
PROFESSIONAL ENGINEER 16581 digitally signed OREGON JUL 20, 1993 WILLIAM E BARLOW
EXPIRES: 12/31/25


CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com


DATE 1.17.2024
SCALE AS SHOWN
DRAWN WEB
SHEET S3.0

## KEY NOTES

1. 2x10 PURLINS @ 24" OC w/SIMPSON HU210TF EACH END TYPICAL SEE 5/S6.0
2. BRACE SEE 8/S6.0
3. 2x10 BLOCKING @ 48" OC TYPICAL AT TRUSS PAIRS SEE 5/S6.0
4. (2) 2x10 BLOCKING @ BRACE, TYPICAL




5' 2'-6" 0 5' 10'

SCALE: 3/16"=1'-0"

## A ROOF FRAMING PLAN

SCALE: 3/16"=1'-0"

N

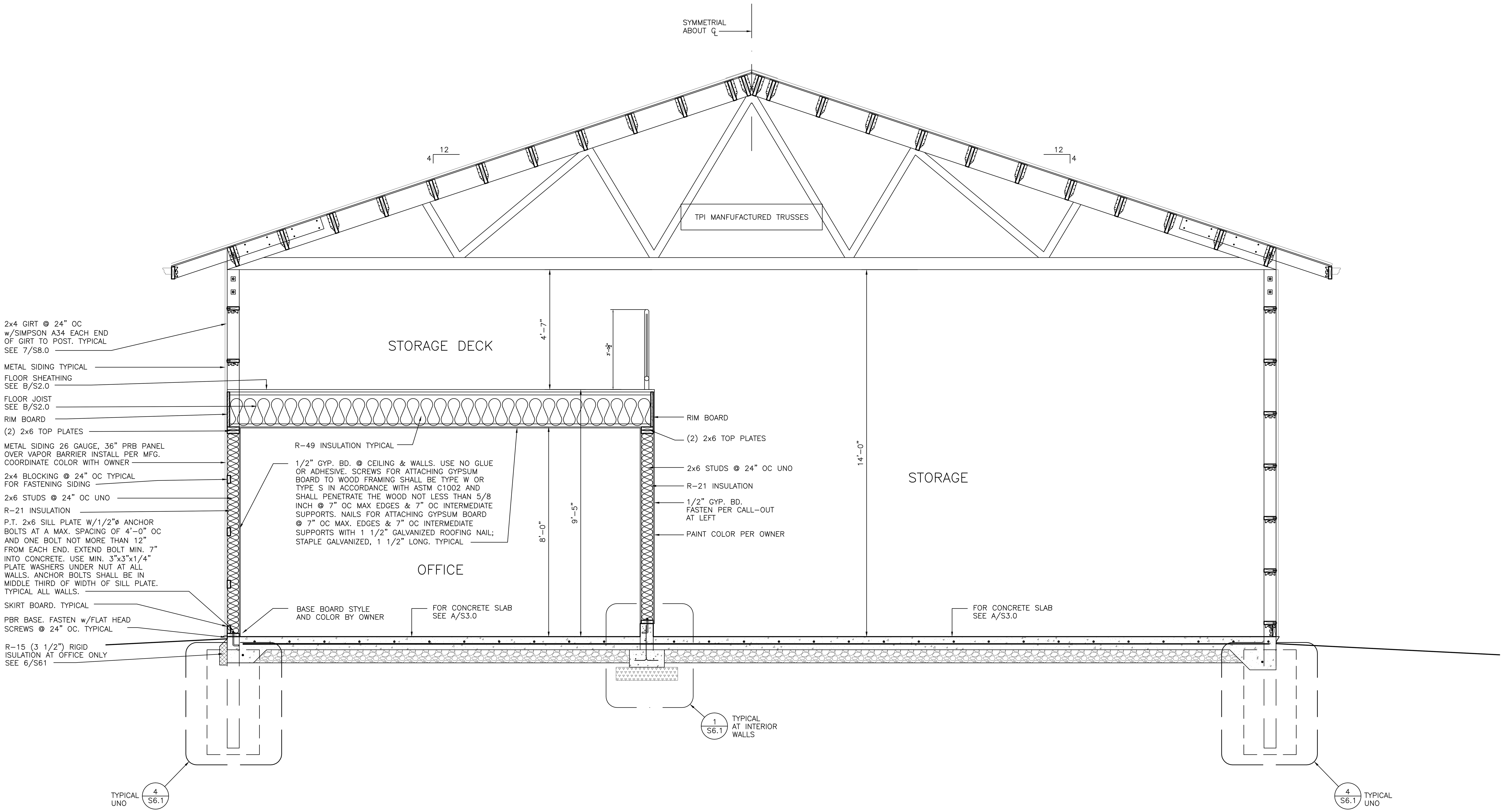
| REVISIONS | BY |
|---|---|
| | |

# A NEW STORAGE POLE BUILDING
110 SW 53rd ST
CORVALLIS, OR 97333
ROOF FRAMING PLAN

PROFESSIONAL ENGINEER 16581 digitally signed OREGON JUL 20, 1993 WILLIAM E BARLOW
EXPIRES: 12/31/25


CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com


DATE 1.17.2024
SCALE AS SHOWN
DRAWN WEB
SHEET S4.0




## A TRANSVERSE SECTION

SCALE: 1/2"=1'-0"

| REVISIONS | BY |
|---|---|
| | |
| | |
| | |
| | |
| | |

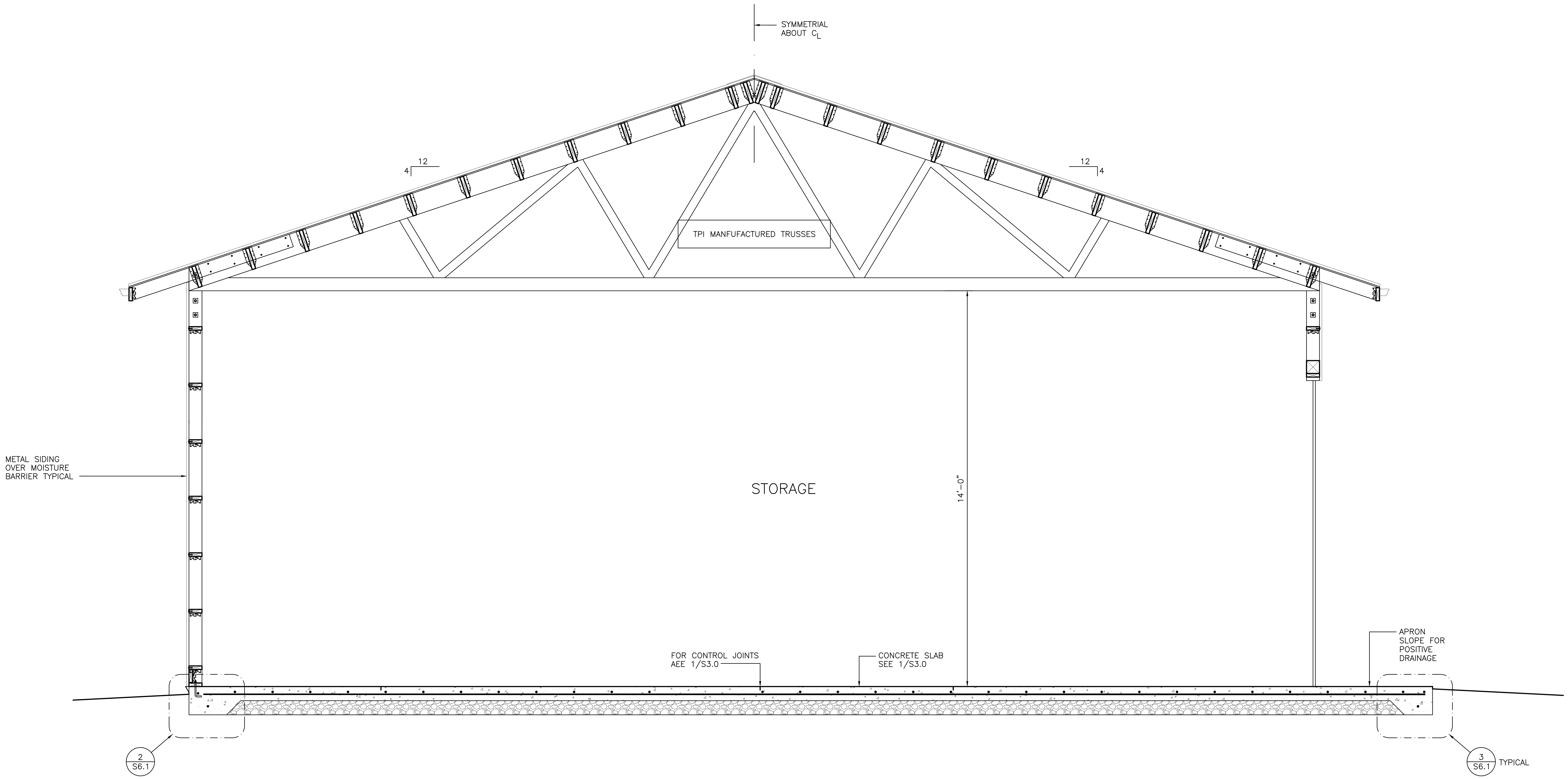
# A NEW STORAGE POLE BUILDING
110 SW 53rd ST
CORVALLIS, OR 97333

TRANSVERSE SECTION

PROFESSIONAL ENGINEER 16581 digitally signed OREGON JUL 20, 1993 WILLIAM E BARLOW
EXPIRES: 12/31/25

CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com

DATE 1.17.2024
SCALE AS SHOWN
DRAWN WEB
SHEET S5.0




A TRANSVERSE SECTION

SCALE: 1/2"=1'-0"

| REVISIONS | BY |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |

# A NEW STORAGE POLE BUILDING

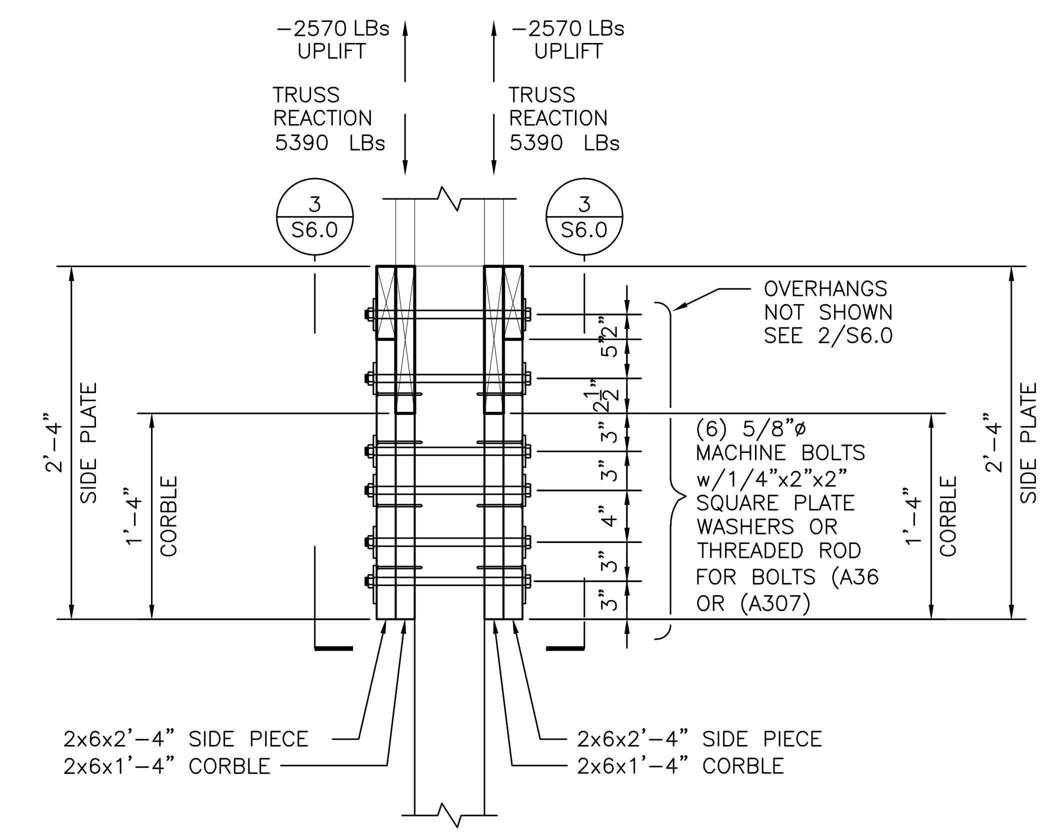
110 SW 53rd ST
CORVALLIS, OR 97333

TRANSVERSE SECTION

PROFESSIONAL ENGINEER
16581
digitally signed
OREGON
JUL 20, 1993
WILLIAM E BARLOW
EXPIRES: 12/31/25

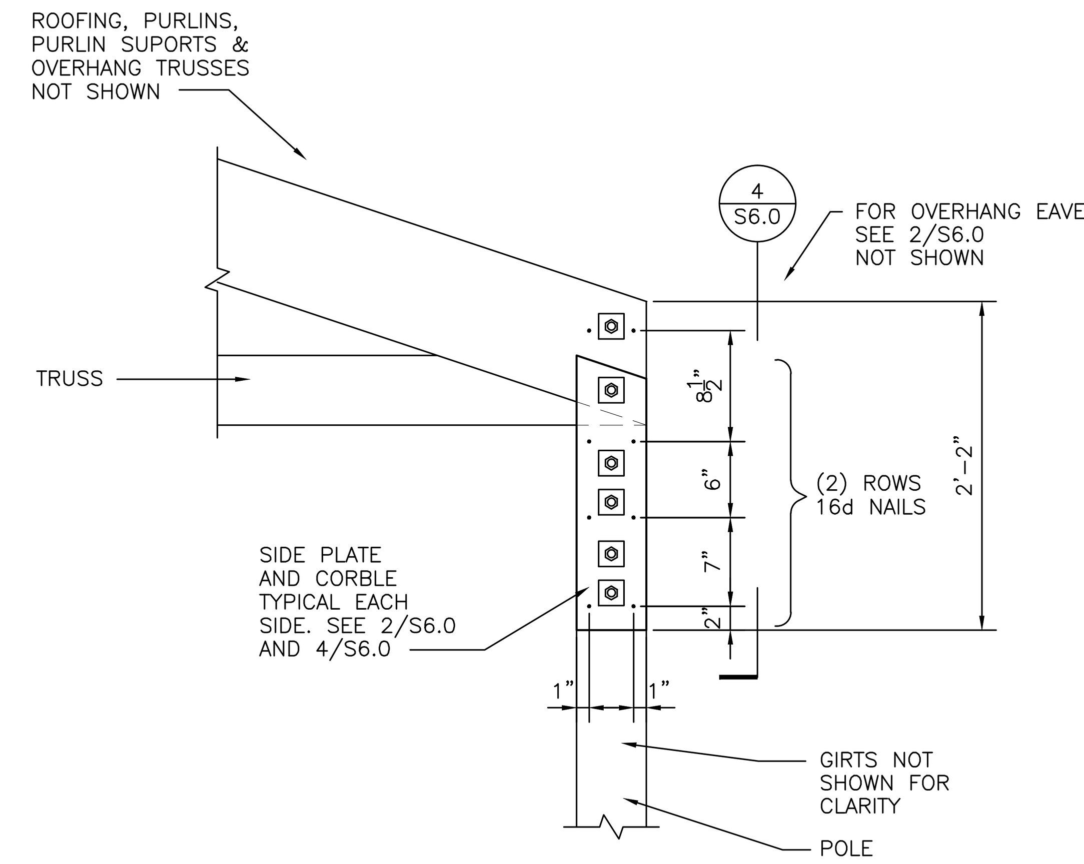
CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com

DATE 1.17.2024
SCALE AS SHOWN
DRAWN WEB
SHEET S5.1



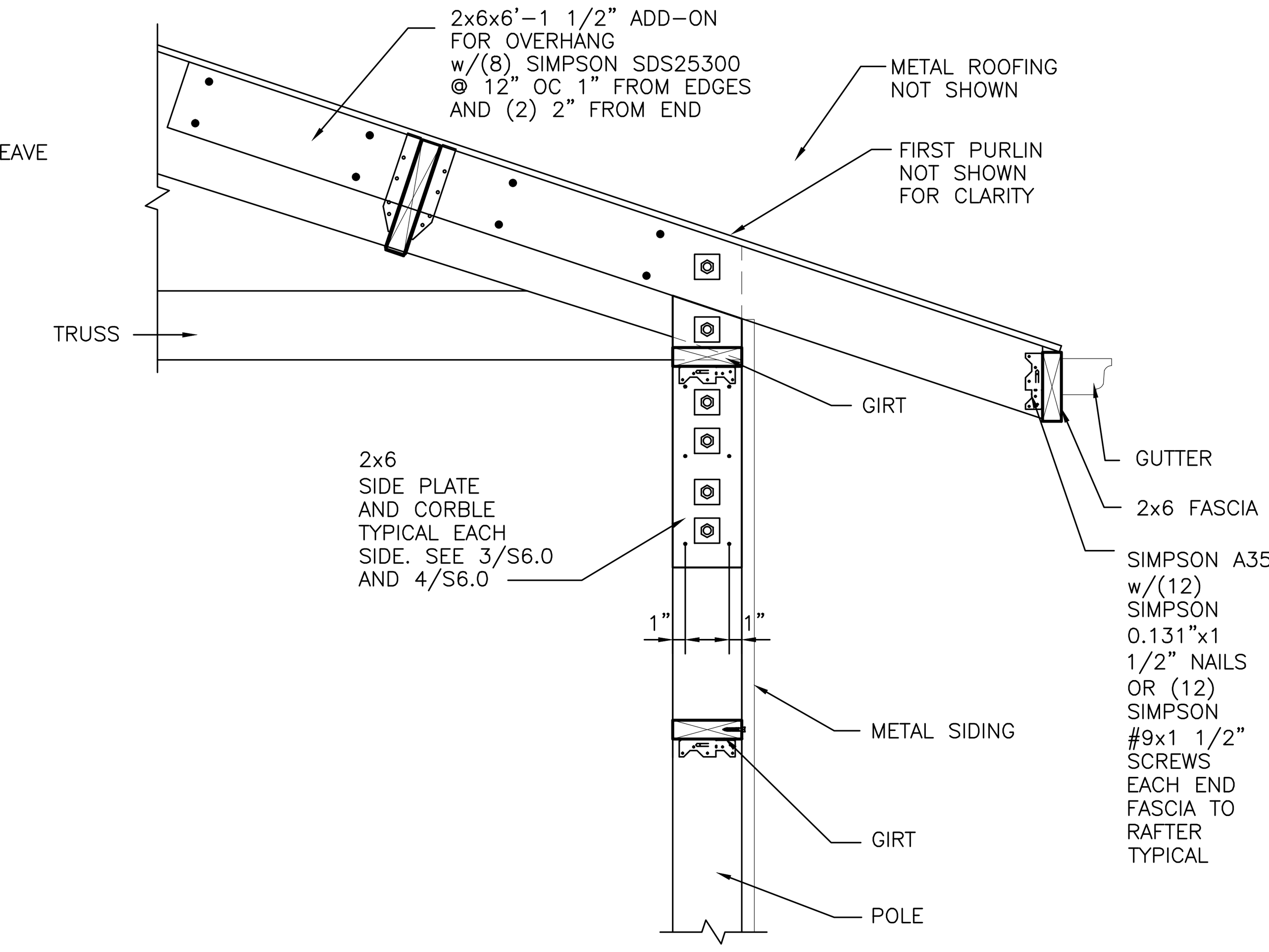

4 DETAIL

SCALE: 1"=1'-0"



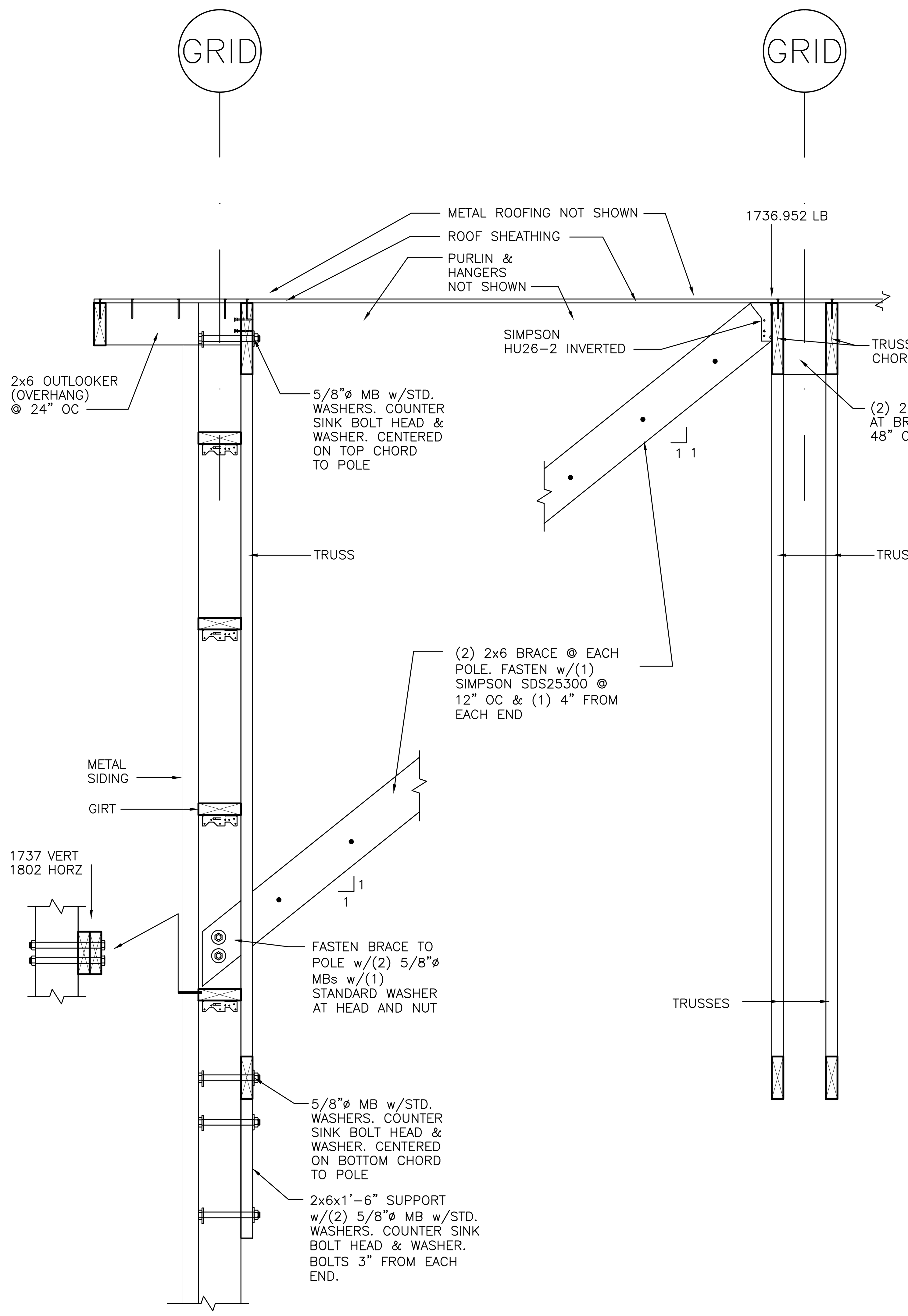

3 DETAIL

SCALE: 1"=1'-0"



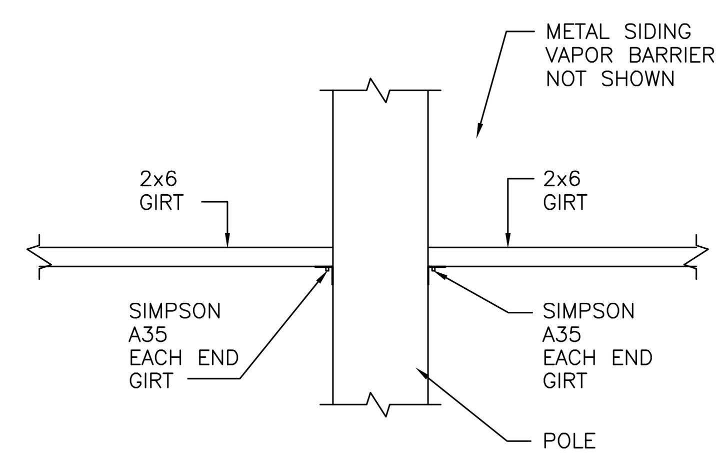

2 DETAIL

SCALE: 1"=1'-0"



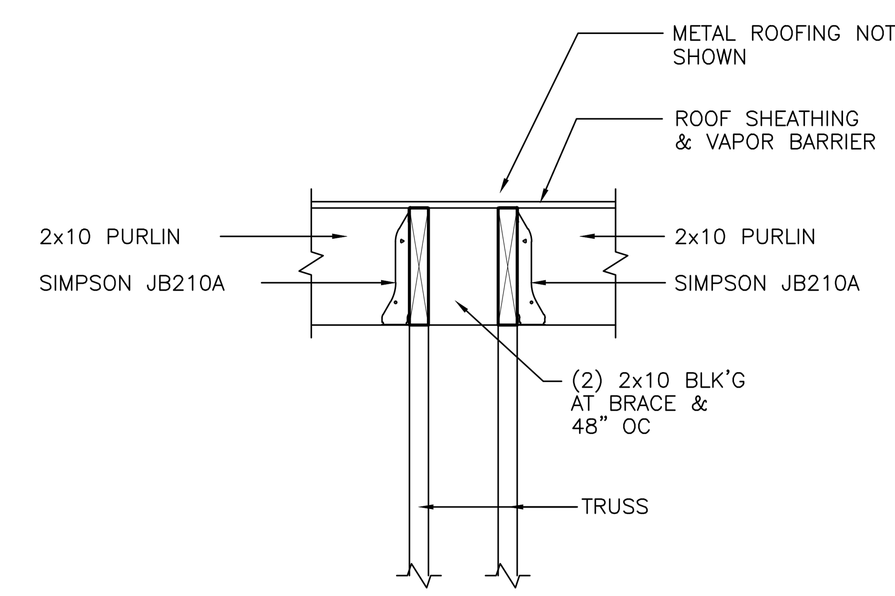

8 BRACE

SCALE: 1"=1'-0"




6 DETAIL

SCALE: 1"=1'-0"




5 DETAIL

SCALE: 1"=1'-0"

7 NOT USED

SCALE: 1"=1'-0"

1 NOT USED

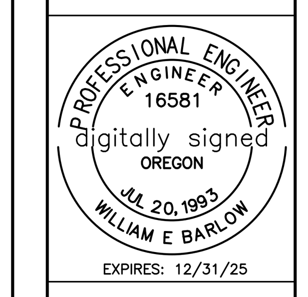
SCALE: 1"=1'-0"

| REVISIONS | BY |
|---|---|
| | |

# A NEW STORAGE POLE BUILDING

110 SW 53rd ST
CORVALLIS, OR 97333

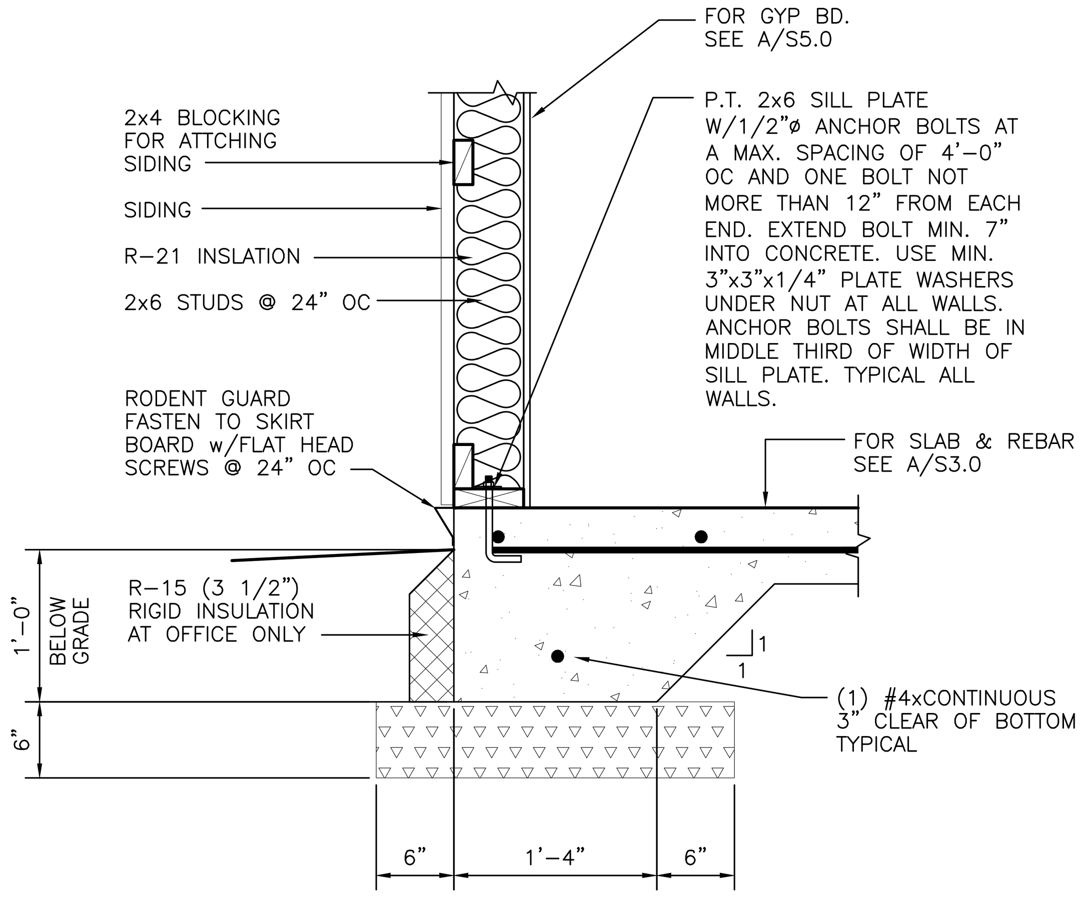
DETAILS




CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com

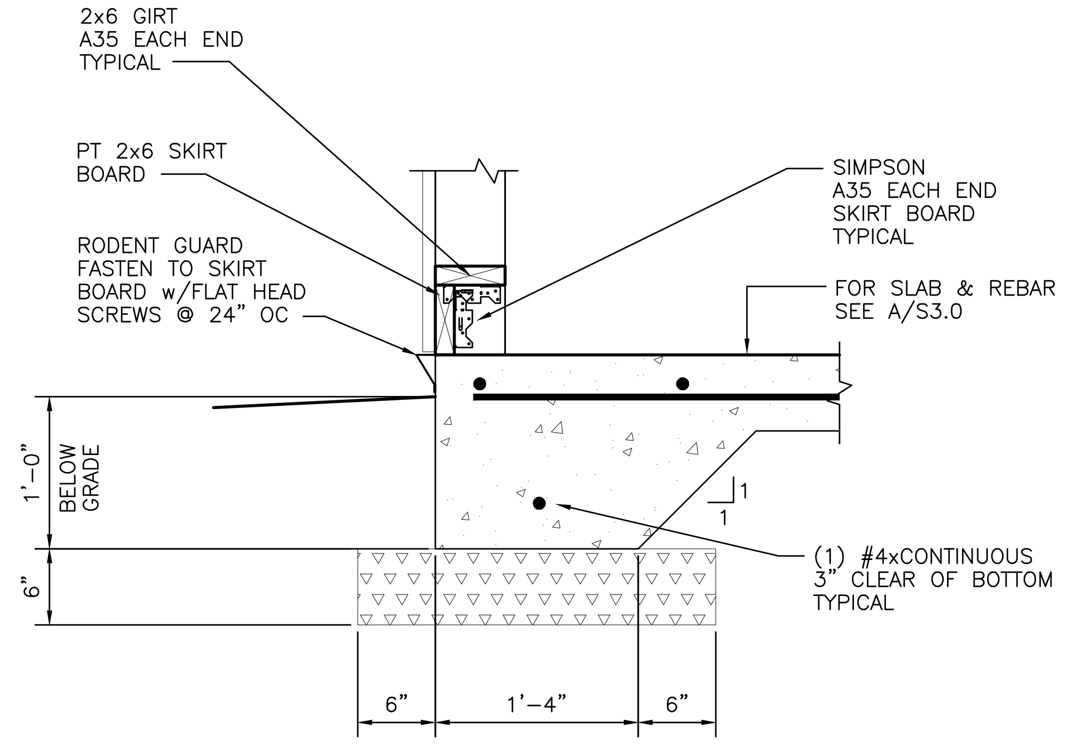
DATE 1.17.2024
SCALE AS SHOWN
DRAWN WEB
SHEET S6.0

| REVISIONS | BY |
| --- | --- |
| | |



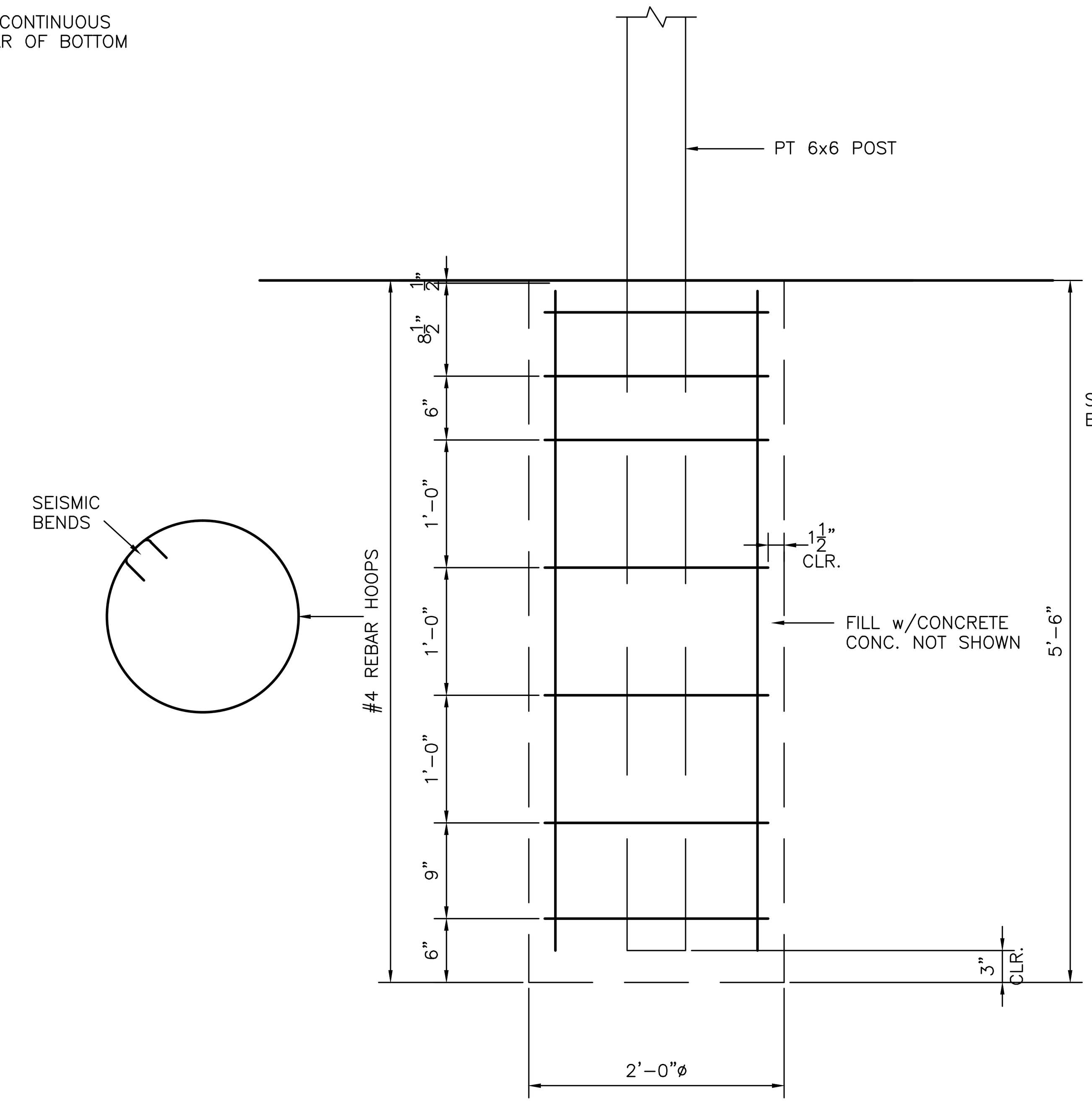

7 DETAIL

SCALE: 1"=1'-0"



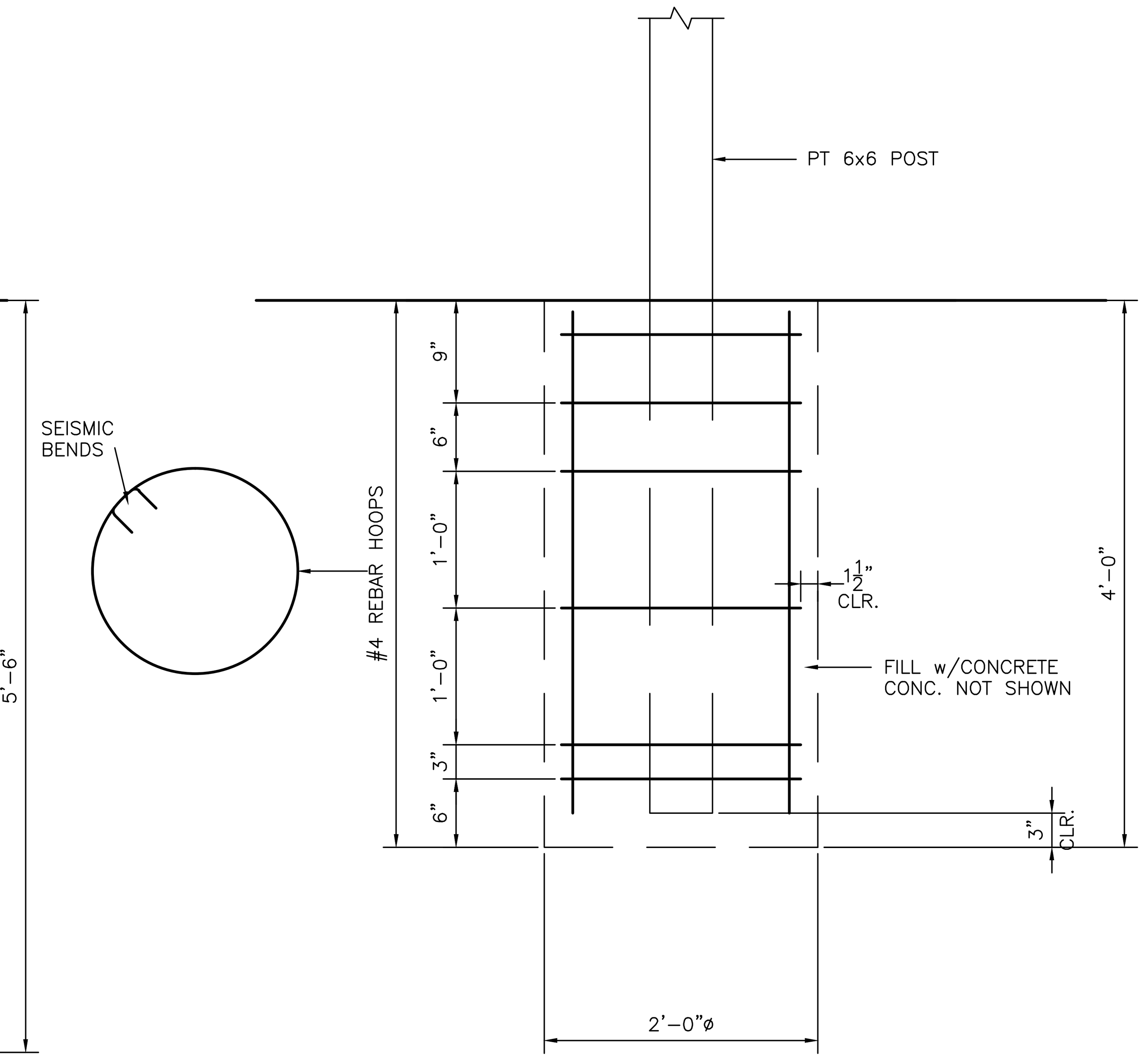

6 DETAIL

SCALE: 1"=1'-0"



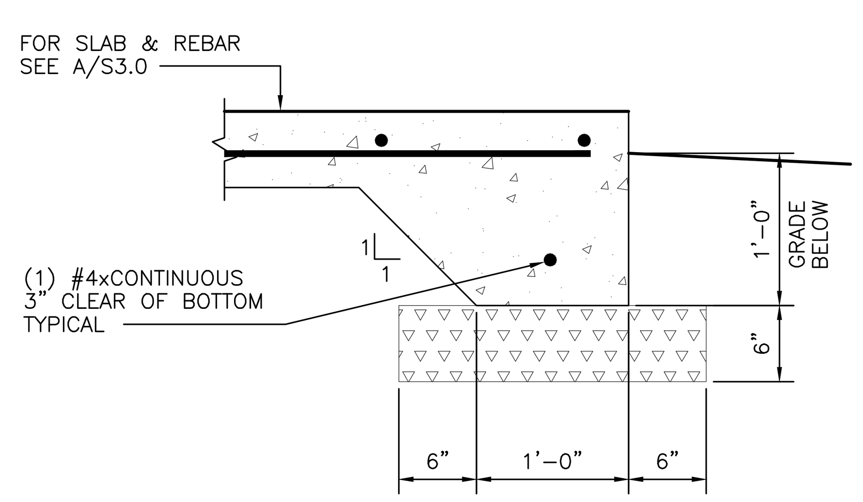

5 DETAIL

SCALE: 1"=1'-0"



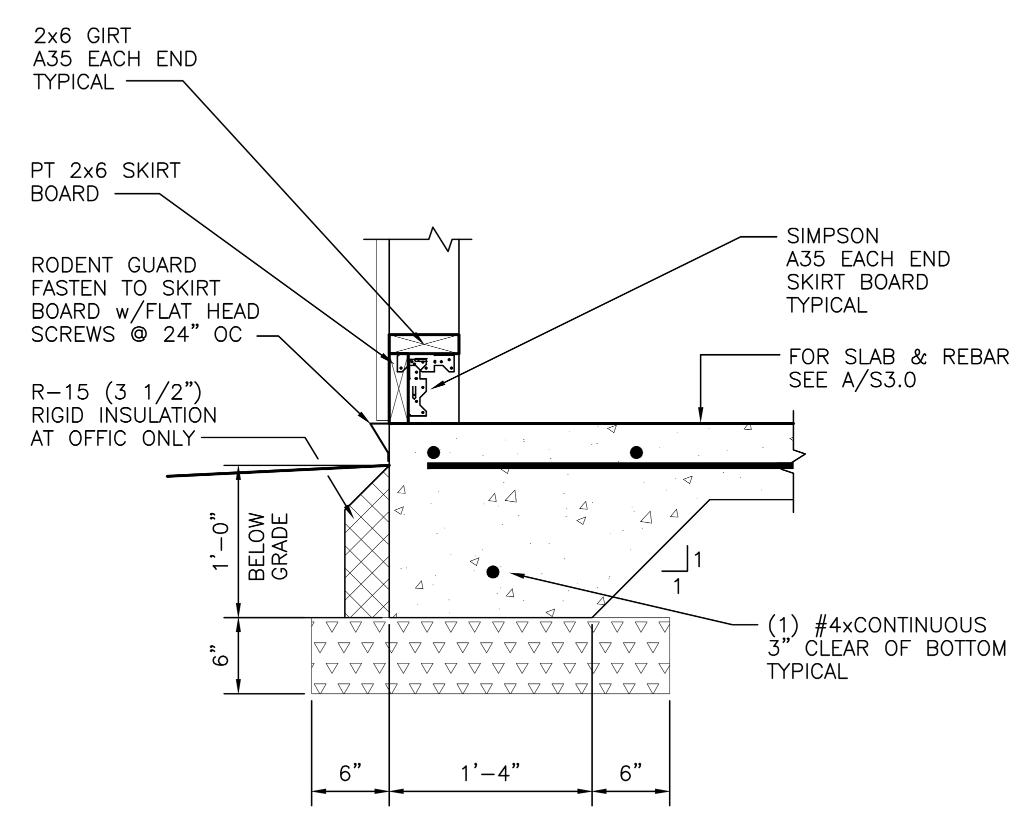

4 DETAIL

SCALE: 1"=1'-0"



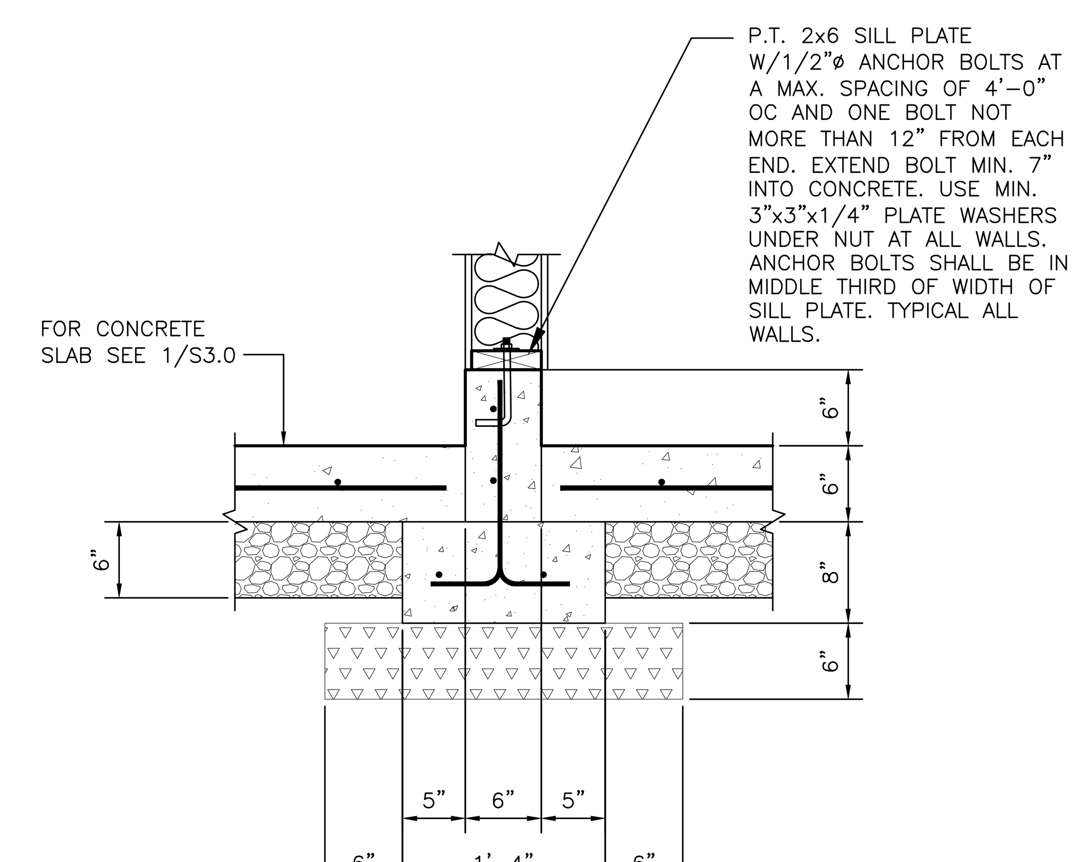

3 DETAIL

SCALE: 1"=1'-0"




2 DETAIL

SCALE: 1"=1'-0"




1 DETAIL

SCALE: 1"=1'-0"

# A NEW STORAGE POLE BUILDING

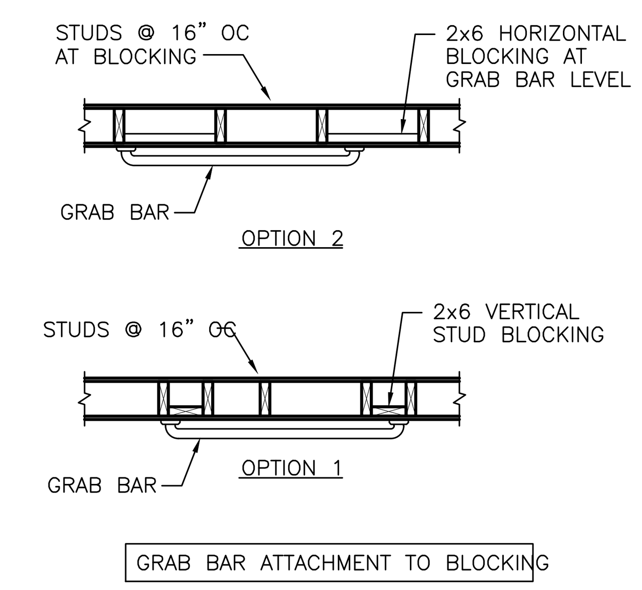
110 SW 53rd ST
CORVALLIS, OR 97333

DETAILS

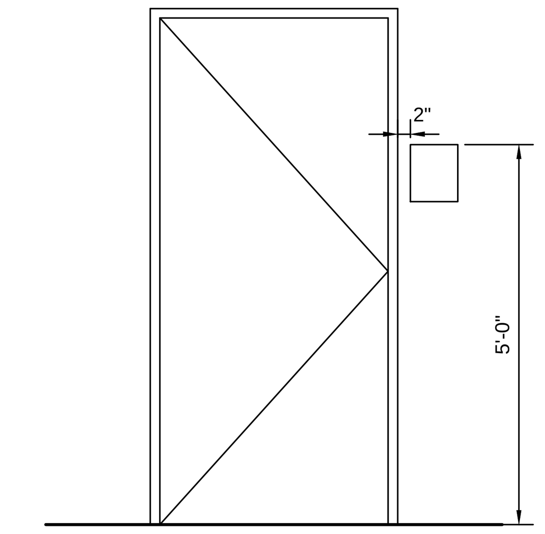
PROFESSIONAL ENGINEER 16581
digitally signed
OREGON
JUL 20, 1993
WILLIAM E BARLOW
EXPIRES: 12/31/25

CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com

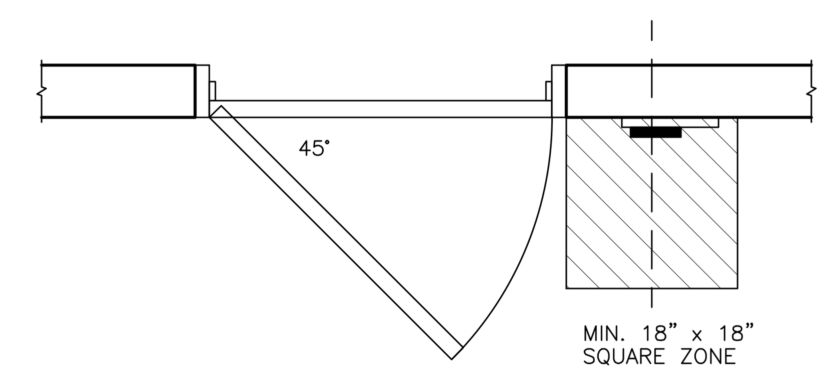
| | |
| --- | --- |
| DATE | 1.17.2024 |
| SCALE | AS SHOWN |
| DRAWN | WEB |
| SHEET | S6.1 |




5 DETAIL
NOT TO SCALE




4 SIGNAGE LOCATION
NOT TO SCALE




MINIMUM CLEARANCE ZONE

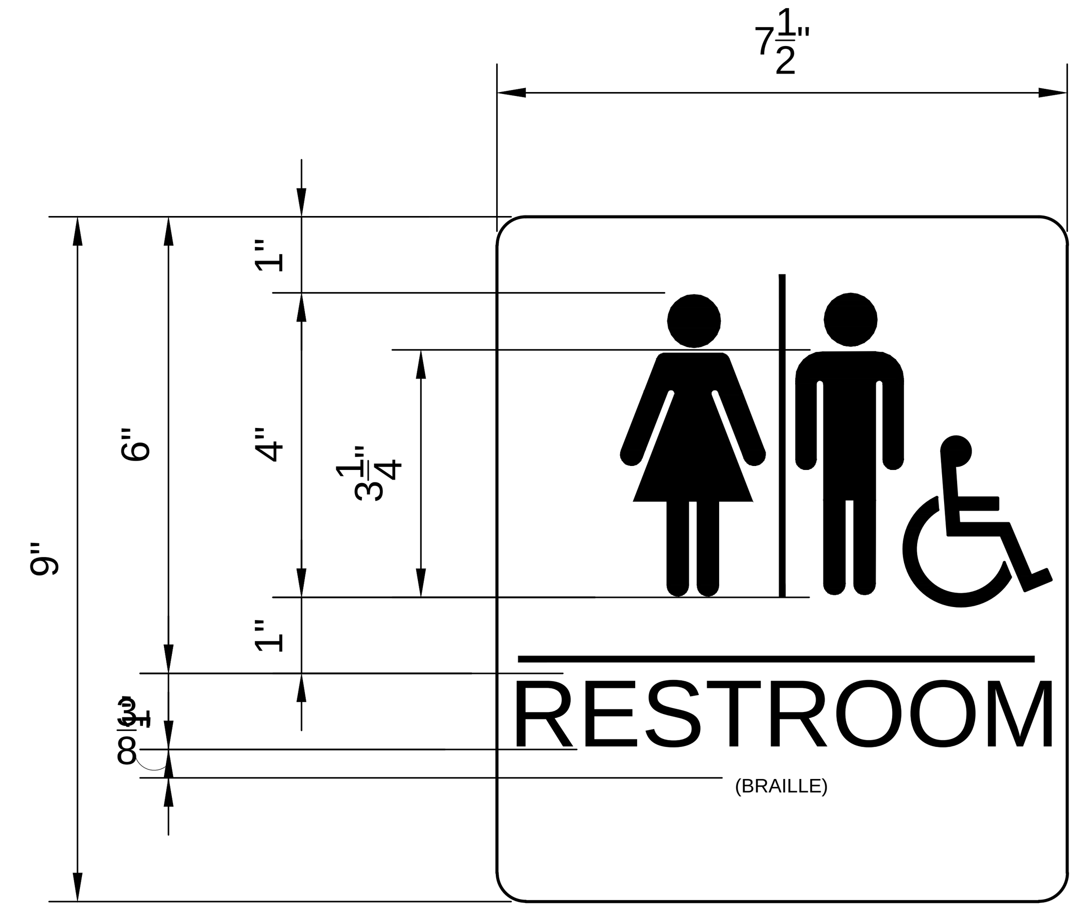
SIGNS CONTAINING TACTILE CHARACTERS SHALL BE LOCATED SO THAT A CLEAR FLOOR SPACE OF 18 INCHES MINIMUM BY 18 INCHES MINIMUM, CENTERED ON THE TACTILE CHARACTERS, IS PROVED BEYOND THE ARC OF ANY DOOR SWING BETWEEN THE CLOSED POSITION AND 45 DEGREES OPEN POSITION.

3 SIGNAGE LOCATION
NOT TO SCALE

| RESTROOM KEY NOTES | |
|---|---|
| 1 | WATER CLOSET ADA APPROVED (WALL HUNG OR FLOOR MOUNTED) |
| 2 | 67" RADIUS CIRCULAR TURNING SPACE |
| 3 | SIGNAGE SEE 2, 3, &4/S7.0 |
| 4 | TOWEL DISPENSER |
| 5 | SOAP DISPENSER |
| 6 | SEAT COVER DISPENSER |
| 7 | MIRROR |
| 8 | COAT HOOK NOT HIGHER THAN 48" ABOVE FLOOR. |
| 9 | TOILET PAPER HOLDER |
| 10 | SANITARY NAPKIN WASTE RECEPTACLE |
| 11 | 42" GRAB BAR FOR ATTACHMENT SEE 5/A7.0 |
| 12 | 36" GRAB BAR FOR ATTACHMENT SEE 5/A7.0 |
| 13 | 30"x52" CLEAR SPACE |
| 14 | 60"x56" CLEAR SPACE |
| 15 | FOR EXHAUST FAN & LIGHTS SEE ELECTRICAL |
| 18 | TRASH RECEPTICAL |
| 19 | FLOOR FINISH MATERIAL SHALL HAVE A SMOOTH , HARD NONABSORBEN SURFACE. THE INTERSECTION OF FLOORS AND WALLS SMOOTH, HARD, NONABSORBENT VERTICAL BASE THAT EXTENDS UPWARD ONTO THE WALLS NOT LESS THAN 4 INCHES. |

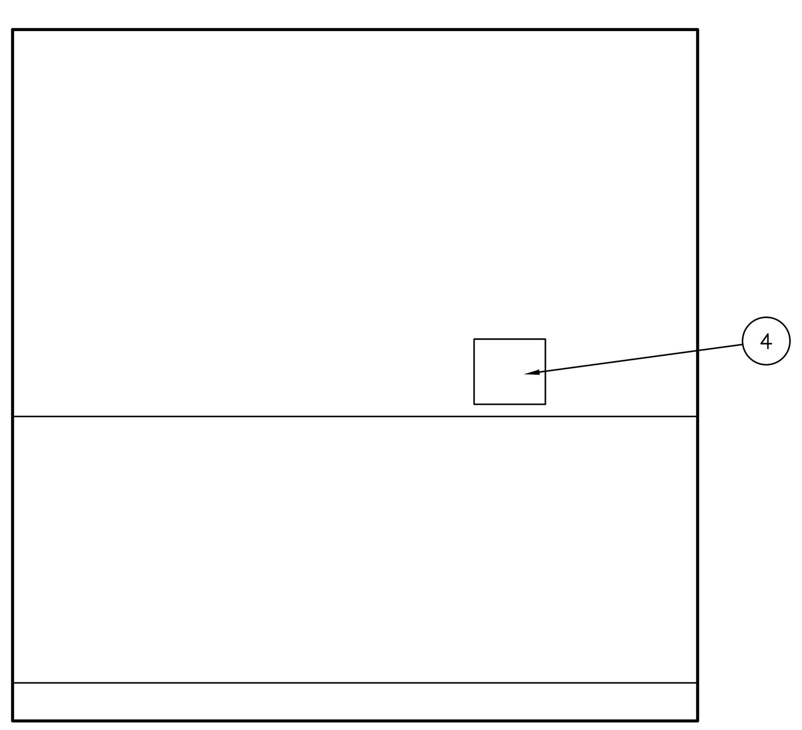
**GENERAL NOTES**

1. COORDINATE BRAND/MANUFACTURER OF TOILET ROOM PRODUCTS INCLUDING ACCESSORIES AND FLOORING WITH PROJECT MANAGER
2. FOR PAINT AND COLOR SEE PROJECT MANAGER

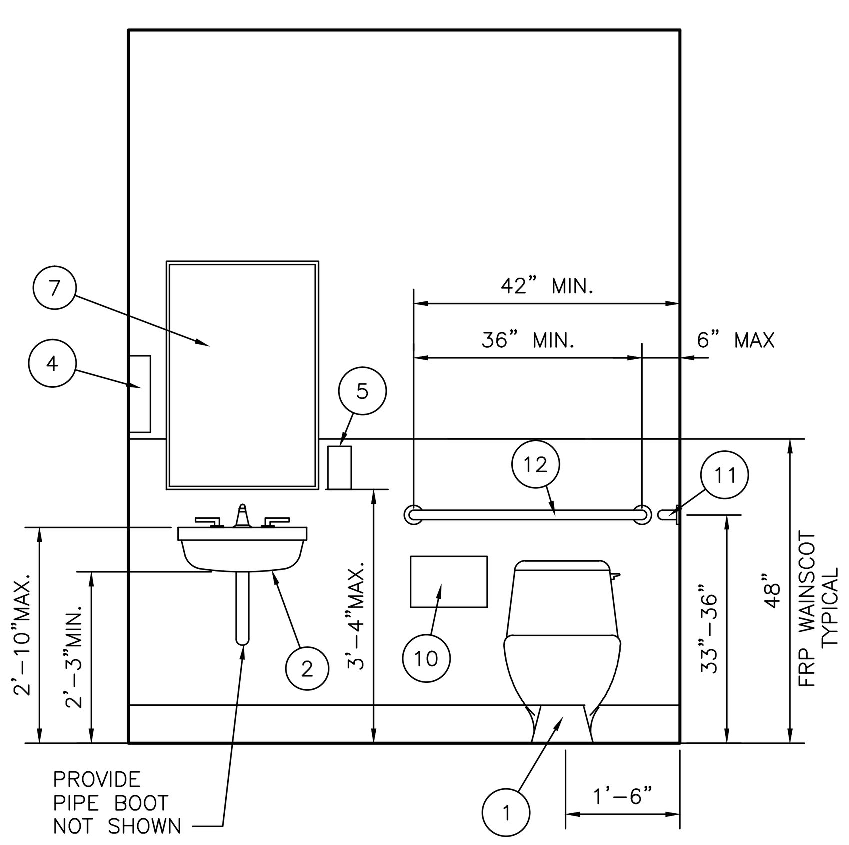



CHARACTERS/FONT: HELVETICAL 123
RAISED 1/32" MINIMUM & 1/8" MIN. SPACING

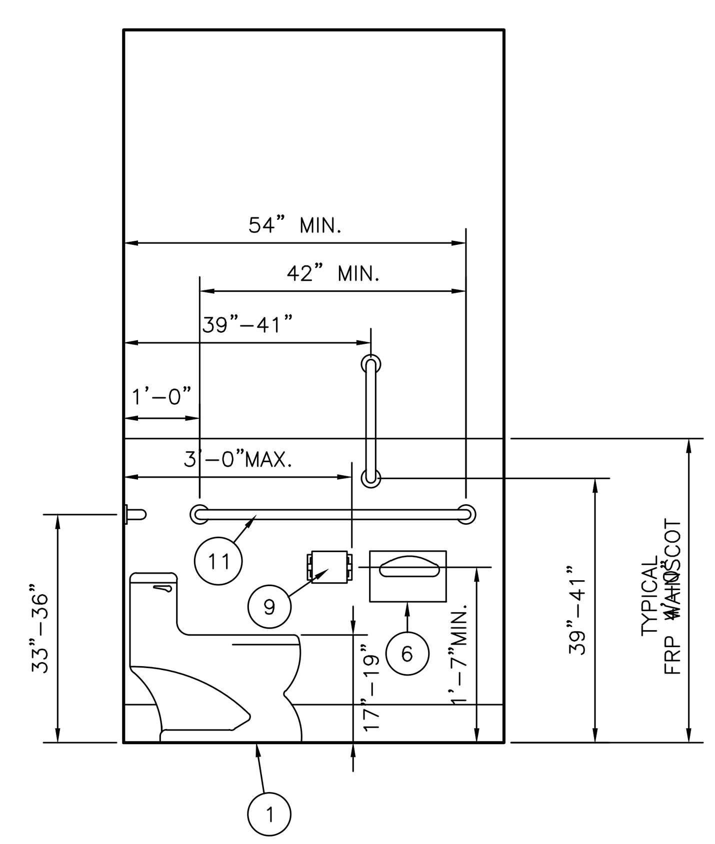
2 SIGNAGE
NOT TO SCALE



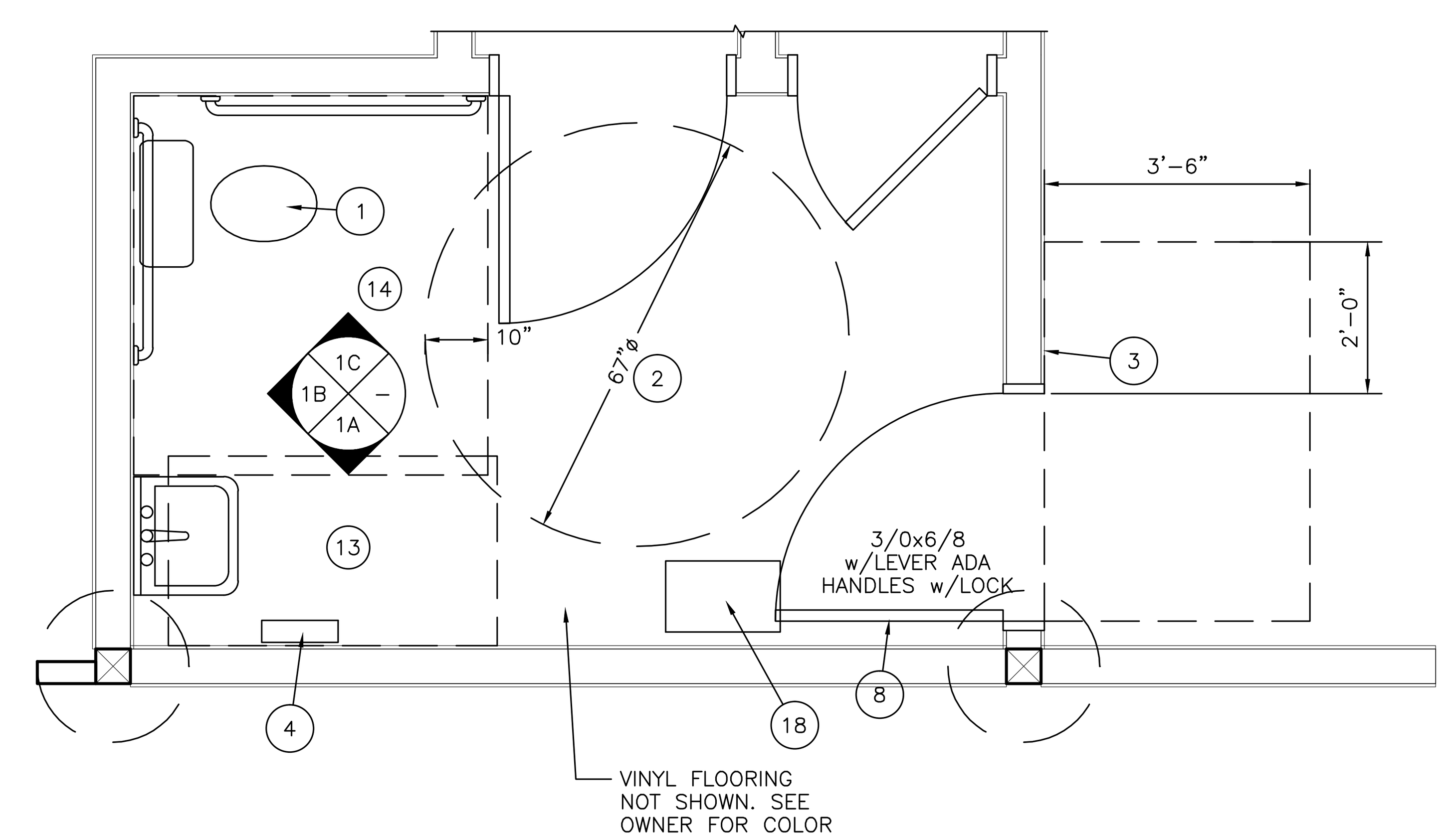

1A ELEVATIONS
SCALE: 1/2"=1'-0"




1B ELEVATIONS
SCALE: 1/2"=1'-0"




1C ELEVATIONS
SCALE: 1/2"=1'-0"




A ENLARGED VIEW
SCALE: 1/2"=1'-0"

N

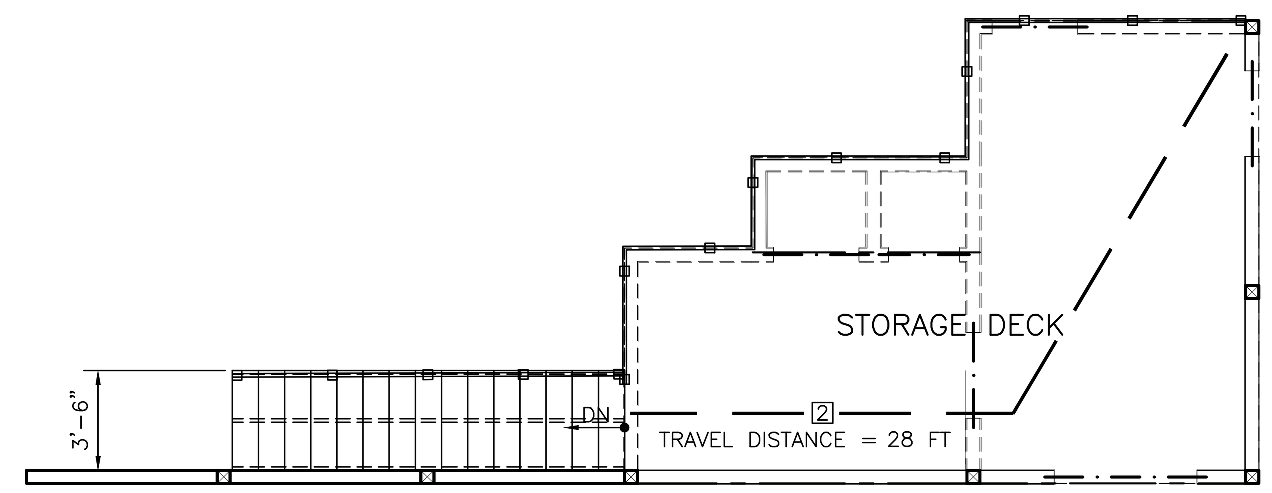
| REVISIONS | BY |
|---|---|
| | |

# A NEW STORAGE POLE BUILDING
110 SW 53rd ST
CORVALLIS, OR 97333
ENLARGED RESTROOM PLAN

PROFESSIONAL ENGINEER
16581
digitally signed
OREGON
JUL 20,1993
WILLIAM E BARLOW
EXPIRES: 12/31/25

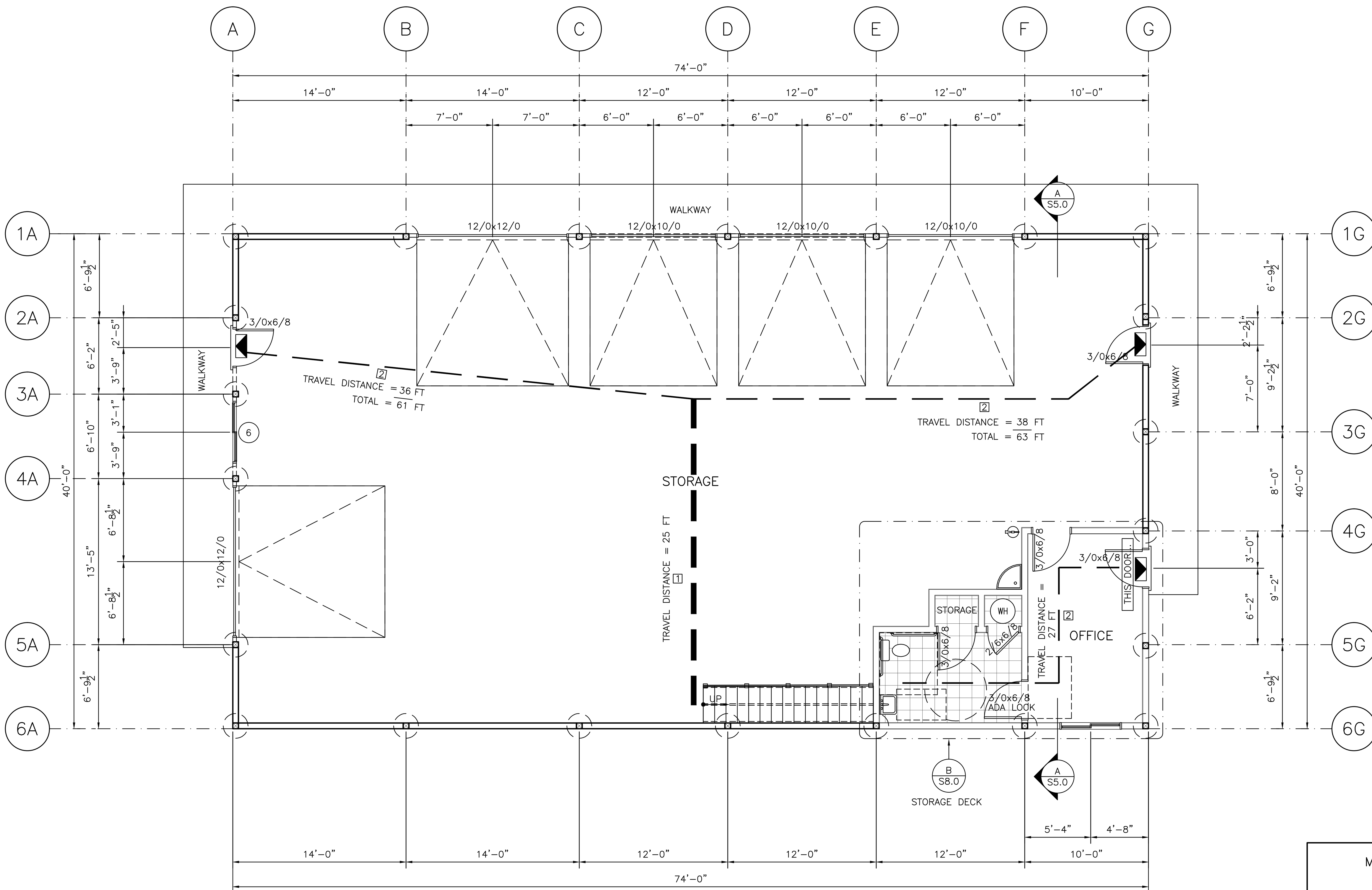

CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com


| | |
|---|---|
| DATE | 1.17.2024 |
| SCALE | AS SHOWN |
| DRAWN | WEB |
| SHEET | S7.0 |




## B STORAGE DECK

SCALE: 3/16"=1'-0"




## A EGRESS PLAN

SCALE: 3/16"=1'-0"

# CODE REVIEW DATA

## CODE REVIEW

1. 2014 OREGON STRUCTURAL SPECIALTY CODE
2. 2010 OREGON ENERGY EFFICIENCY SPECIALTY CODE
3. MECHANICAL, ELECTRICAL, PLUMBING, COMMUNICATIONS, SECURITY, ETC., BY OTHERS

## BUILDING INFORMATION

| | |
|---|---|
| OCCUPANCY | B AND S-1 |
| CONSTRUCTION TYPE | V, B |
| AUTOMATIC SPRINKLER | NOT REQUIRED |
| BUILDING HEIGHT | EXISTING: 18'-0" ROOF MEAN HEIGHT |
| NUMBER OF STORIES | 1 |

GROUP B: NO FIRE ALARM OR DETECTION SYSTEM REQUIRED (2014 OFC: 907.2.7)
NO AUTOMATIC SPRINKLER SYSTEM REQUIRED (2014 OFC: 903)
GROUP S-1: NO FIRE ALARM OR DETECTION SYSTEM REQUIRED (2014 OFC: 907)
NO AUTOMATIC SPRINKLER SYSTEM REQUIRED (2014 OFC: 903.2.9)

## BUILDING AREA (OCCUPANCY CALCULATIONS)

| FUNCTION OF SPACE | AREA (GSF) | AREA PER OCCUPANT | OCCUPANT LOAD |
|---|---|---|---|
| STORAGE | 2599 SQ. FT. | 300 GROSS | 9 |
| STORAGE DECK | 279 SQ. FT. | 300 GROSS | 1 |
| BUSINESS (OFFICE) | 224 SQ. FT. | 100 GROSS | 3 |

## EGRESS CAPACITY TABULATION (ECT)

| OCCUPANCY | OCCUPANT LOAD | EGRESS WIDTH REQUIRED | EGRESS WIDTH PROVIDED |
|---|---|---|---|
| B | 3 | 36" | 36" |
| STORAGE | 9 | 36" | 36" |
| STORAGE DECK | 4 | 36" | 36" |

## MEASUREMENT OF MEANS OF EGRESS

| | | ACTUAL | OSSC 2014 |
|---|---|---|---|
| 1 COMMON PATH OF EGRESS TRAVEL | MAX. 200' | SEE PLAN | TABLE 1014.3 |
| 2 EXIT ACCESS TRAVEL DISTANCE | MAX. 250' | SEE PLAN | TABLE 1016.2 |
| MAXIMUM DEAD END CORRIDOR LENGTH | – | – | – |
| MINIMUM CORRIDOR WIDTH | – | – | – |
| MINIMUM CLEAR OPENING OF EXIT DOOR | SEE ECT ABOVE | SEE ECT ABOVE | 1008.1.1 |

## NOTES

1. THE MEANS OF EGRESS SHALL BE ILLUMINATED AT ALL TIMES THE SPACE SERVED BY MEANS OF EGRESS IS OCCUPIED.
   1.1 IN THE EVENT OF POWER FAILURE AN EMERGENCY ELECTRICAL SYSTEM SALL AUTOMATICALLY ILLUMINATE EXIT ACCESS AREAS. POWER DURATION SHALL BE NOT LESS THAN 90 MINUTES.
2. 2.1. THE LOCKING DEVICE IS READILY DISTINGUISHABLE AS LOCKED;

   2.2. A READILY VISIBLE DURABLE SIGN IS POSTED ON THE EGRESS SIDE ON OR ADJACENT TO THE DOOR STATING: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED. THE SIGN SHALL BE IN LETTERS 1 INCH (25 MM) HIGH ON A CONTRASTING BACKGROUND; AND

   2.3. THE USE OF THE KEY-OPERATED LOCKING DEVICE IS REVOKABLE BY THE BUILDING OFFICIAL FOR DUE CAUSE.

## MAXIMUM QUANTITIES OF HAZARDOUS MATERIAL TO BE STORED

STORAGE AREA:
STORAGE OF HAZADAROUS MATERIAL IS PLANNED TO BE A MAXIMUM OF 20 GALLONS FOR GASOLINE AND A MAXIMUM OF 20 GALLONS OF DIESEL FUEL.

STORAGE DECK AREA:
NONE PLANNED

## SYMBOL LEGEND

| | |
|---|---|
| (fire extinguisher symbol) | WALL MOUNTED FIRE EXTINGUISHER (BASIC MIN. RATING: 20B) |
| (exit sign symbol) | ILLUMINATED EXIT SIGN ELECTRICALLY POWERED, SELF- LUMNOUS OR PHOTOLUMINESCENT LABELED IN ACCORDANCE WITH UL 924 AND INSTALLED PER MANUFACTURER'S INSTRUCTIONS. EXIT SIGN SHALL BE ILLUMINATED AT ALL TIMES. |
| — — — | 1 COMMON PATH OF EGRESS TRAVEL |
| ▬ ▬ ▬ | 2 EXIT ACCESS |
| THIS DOOR... | SIGN: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED LETTERS 1" HIGH ON CONTRASTING BACKGROUND |

| REVISIONS | BY |
|---|---|
| | |

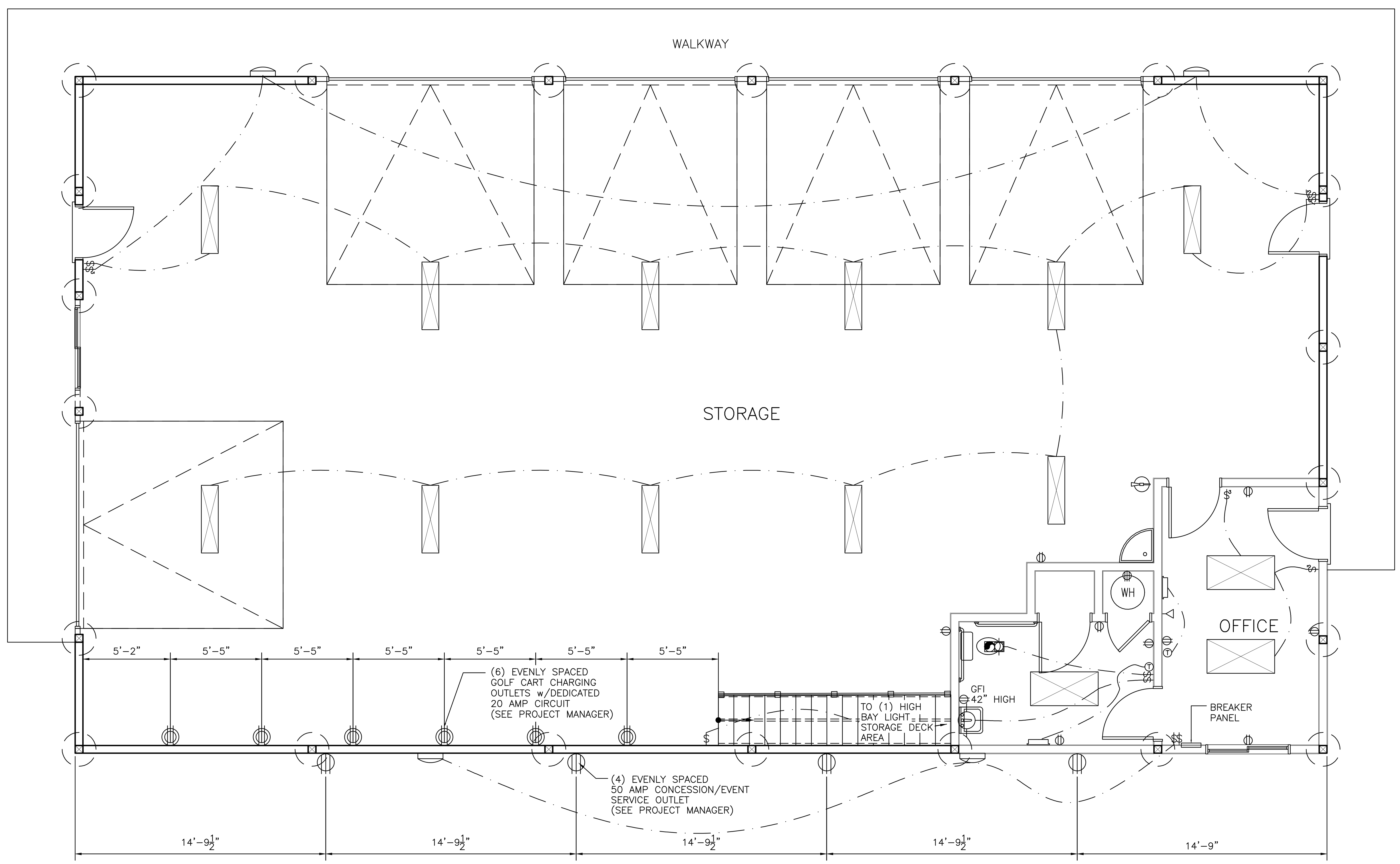
# A NEW STORAGE POLE BUILDING
110 SW 53rd ST
CORVALLIS, OR 97333

CODE ANALYSIS AND EGRESS PLAN

PROFESSIONAL ENGINEER 16581 OREGON digitally signed JUL 20, 1993 WILLIAM E BARLOW
EXPIRES: 12/31/25

CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com

| | |
|---|---|
| DATE | 1.17.2024 |
| SCALE | AS SHOWN |
| DRAWN | WEB |
| SHEET | S8.0 |




A ELECTRCAL PLAN

SCALE: 1/4"=1'-0"

## ELECTRICAL LAYOUT LEGEND

COORDINATE MANUFACTURER/BRAND WITH PROJECT MANAGER

| | |
|---|---|
| ◁ | TELEPHONE OUTLET |
| ⦶ | DUPLEX RECEPTACLE 15" ABOVE FLOOR (U.N.O.) |
| ⦶ | 220 V. RECEPTACLE |
| ⦶ | GOLF CART CHARGING OUTLETS w/DEDICATED 20 AMP CIRCUIT |
| $ | SWITCH |
| $3 | 3-WAY SWITCH |
| | FAN / LIGHT UNIT |
| | CADET WALL HEATER 120V CSC151TW 1500W INSTALL PER MFG |
| | LIGHT (OVERHEAD) |
| | LIGHT (WALL HUNG) |
| | EXTERIOR AREA LIGHT |
| Ⓣ | THERMOSTAT |
| | 4' HIGH BAY LIGHT GREATER THAN OR EQUAL TO 5600 LUMENS 2-LIGHT LED |
| | 2'x4' CEILING MOUNTED LIGHT FIXTURE w/LED TUBES |

| REVISIONS | BY |
|---|---|
| | |

# A NEW STORAGE POLE BUILDING
110 SW 53rd ST
CORVALLIS, OR 97333
ELECTRICAL PLAN

PROFESSIONAL ENGINEER 16581 digitally signed OREGON JULY 20, 1993 WILLIAM E BARLOW
EXPIRES: 12/31/25


CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengdesign.com


DATE 1.17.2024
SCALE AS SHOWN
DRAWN WEB
SHEET E1.0

# STRUCTURAL CALCULATIONS

*Project*

A NEW STORAGE POLE BUILDING
AT
BENTON COUNTY FAIRGROUNDS
110 SW 53rd ST
CORVALLIS, OR 97333

*Client*

Shane Galloway,
Maintenance Manager, Benton County
Natural Areas Parks and Events Department
Office, 110 SW 53rd St.
Corvallis OR 97333
Work Cell 541 760-3741
Main Office 541 766-6025
Shane.Galloway@bentoncountyor.gov

*


*

*by*

**Civil Engineering Design**
William E. Barlow, P.E.
P.O. Box 43
Philomath, OR 97370
541-609-8777

January 17, 2024

# Table of Contents

# A NEW STORAGE POLE BUILDING AT BENTON COUNTY FAIR GROUNDS

## 110 SW 53rd ST
## CORVALLIS, OR 97333

# LATERAL FORCE RESISTING SYSTEM DESIGN NOTES

2022 EDITION OF THE OREGON STRUCTURAL SPECIALTY CODE & ASCE 7–16

## SEISMIC

EARTHQUAKE DESIGN DATA:

| | |
|---|---|
| RISK CATEGORY | II |
| SEISMIC IMPORTANCE FACTOR, Ie: | 1.0 |
| MAPPED SPECTRAL RESPONSE ACCELERATIONS: | |
| Ss: | 0.904 g |
| S1: | 0.478 g |
| SITE CLASS: | D |
| DESIGN SPECTRAL RESPONSE COEFFICIENTS: | |
| SDS: | 0.686 g |
| SD1: | 0.860 g |
| SEISMIC DESIGN CATEGORY: | D |
| SEISMIC FORCE RESISTING SYSTEM: | CANTILEVERED COLUMN SYSTEMS TIMBER FRAMES |
| DESIGN BASE SHEAR, V (SEISMIC): | 20.13 KIPS, N/S; 18.56 KIPS, E/W |
| SEISMIC RESPONSE COEFF. Cs: | 0.4572 |
| RESPONSE MODIFICATION FACTOR, R: | 1 1/2 |
| ANALYSIS PROCEDURE: | EQUIVALENT LATERAL FORCE (ELF) |

## WIND

WIND DESIGN DATA:

| | |
|---|---|
| ULTIMATE DESIGN WIND SPEED, Vult: | 96 M.P.H. (3–SEC GUST) |
| NOMINAL DESIGN WIND SPEED, Vasd: | 74 M.P.H |
| RISK CATEGORY (2022 OSSC, 1604.5): | II |
| WIND EXPOSURE: | C |
| APPLICABLE INTERNAL PRESS. COEFF.: | 0.18± PSF |
| DESIGN WIND PRESS. FOR C&C: | 18 PSF |

## SNOW

| | | |
|---|---|---|
| ROOF SLOPE: | 18.45 DEG. (4:12) | |
| IMPORTANCE FACTOR, Ig= | 1.0 | |
| GROUND SNOW LOAD, Pg= http://snowload.seao.org/lookup.html | 9 P.S.F. | |
| MIN. SNOW LOAD, Pm: | 20 P.S.F. | |
| RAIN ON SNOW: | 0 P.S.F. | |
| EXPOSURE: | C | |
| Ce: | 1.0 | |
| ROOFING MATERIAL: | UNOBSTRUCTED SLIPPERY | |
| Ct: | 1.0 | |
| Cs: | 1.0 | |
| FLAT ROOF SLOW LOAD: Pf=0.7*Ce*Ct*Ig*Pg= | CONSTANT: 0.7<br>6.30 P.S.F. | |
| MIN. SNOW LOAD, Pm= | 20 P.S.F. | USE: 25 P.S.F. (CONSERVATIVE) |
| SLOPED ROOF, Ps: Ps=Cs*Pf= | 6.30 P.S.F. | |
| GROUND SNOW LOAD, g= g=0.13*Pg+14= | CONSTANTS: 0.13 14<br>15.17 P.S.F. | |
| DEPTH GROUND SNOW LOAD, hg= hg=Pg/g= | CONSTANTS:<br>0.60 FT<br>25.28 P.S.F. | FOR DECKS, BALCONIES, ETC. WHOSE HT ABOVE GROUND SURFACE IS LESS THAN hg USE Pm |

## ABBREVIATIONS

| | | | |
|---|---|---|---|
| (N) | NEW | UNO | UNLESS NOTED OTHERWISE |
| (E) | EXISTING | PT | PRESSURE TREATED |
| DO | DITTO (SAME) | CONC. | CONCRETE |
| TPI | TRUSS PLATE INSTITUTE (tpinst.org) | TYP. | TYPICAL |
| OH | OVER HANG (EAVE) | | |

| REVISIONS | BY |
|---|---|
| | |

A NEW STORAGE POLE BUILDING
23100 SW 82nd AVE.
TUALATIN, OR
LATERAL FORCE RESISTING SYSTEM DESIGN NOTES

CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengineeringdesign.com

| | |
|---|---|
| DATE | 11.20.2023 |
| SCALE | AS SHOWN |
| DRAWN | WEB |
| SHEET | SC1.0 |

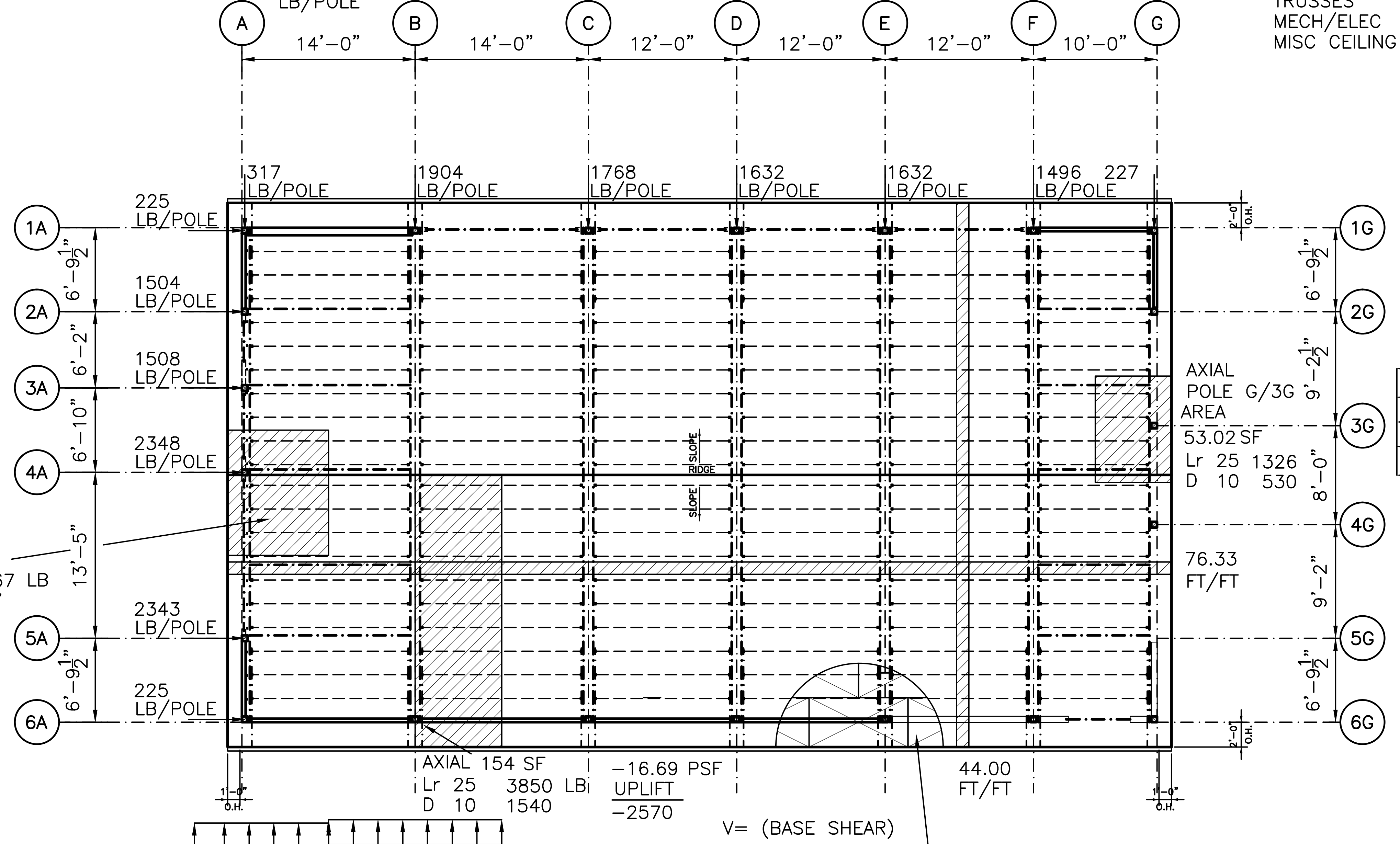
## ROOF DEAD LOADS

| | | |
|---|---|---|
| METAL ROOFING | 1 | LB/FT^2 |
| 1/2" ROOF SHEATHING | 2 | |
| TRUSSES | 2 | |
| MECH/ELEC | 3 | |
| MISC CEILING | 2 | |
| | 10 | LB/FT^2 |

272 LB/FT

7 FT TRIB
1904 LB
6 POLES
317
LB/POLE

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| TRIB | 7 | 14 | 13 | 12 | 12 | 11 | 5 |
| LB | 1904 | 3808 | 3536 | 3264 | 3264 | 2992 | 1360 |
| POLES | 6 | 2 | 2 | 2 | 2 | 2 | 6 |
| LB/POLE | 317 | 1904 | 1768 | 1632 | 1632 | 1496 | 227 |




464 LB/FT

| TRIB | LB | POLES | LB/POLE |
|---|---|---|---|
| 3.40 | 1578 | 7 | 225 |
| 6.48 | 3007 | 2 | 1504 |
| 6.50 | 3016 | 2 | 1508 |
| 10.12 | 4696 | 2 | 2348 |
| 10.10 | 4686 | 2 | 2343 |
| 3.40 | 1578 | 7 | 225 |

8.17 TRIB
w= 272 LB/FT
Ans= 272* 8.17
2222 / 6 POLES
Ans= 370 LB/POLE

14.00 TRIB
w= 272 LB/FT
Bns= 272 *14.00
3808 / 2 POLES
Bns= 1904 LB/POLE

V= (BASE SHEAR)
* 74 FT = 20128 / 1000
LB = 20.13 KIPS

w= 464 LB/FT
Bns= 464 * 8.62
4000 / 2 POLES
Bns= 2000 LB/POLE

V= (BASE SHEAR)
* 40 FT = 18560 / 1000
LB = 18.56 KIPS

7/16" SHEATHING SPAN RATING 24/16 8d GALV. COMMON (2 1/2"x0.131") NAILS OR SIMPSON 2 1/2" HCKWSV212S SCREWS @ 6" OC @ EDGES & 12" OC INTERMEDIATE SUPPORTS TYPICAL AT ROOF

### 1/2 WALL HT
(SHEET SC2.1)
1' STRIP
A= 7.00 FT^2
Dw= 11 LB/FT^2
77 LB/FT
2 WALLS
154 LB/FT

### ROOF N-S
1' STRIP
A= 44.00 FT/FT
D= 10 LB/FT^2
440 LB/FT
154
W= 594 LB/FT
V=Cs(W)
Cs= 0.4572
V= 272 LB/FT

### 1/2 WALL HT
(SHEET SC2.2)
1' STRIP
A= 11.47 FT^2
Dw= 11 LB/FT^2
126 LB/FT
2 WALLS
252 LB/FT

### ROOF E-W
1' STRIP
A= 76.33 FT/FT
W= 10 LB/FT^2
763 LB/FT
252
W= 1015 LB/FT
V=Cs(W)
Cs= 0.4572
V= 464 LB/FT

# A SEISMIC & GRAVITY (VERT.) ROOF PLAN

SCALE: 3/32"=1'-0"

N

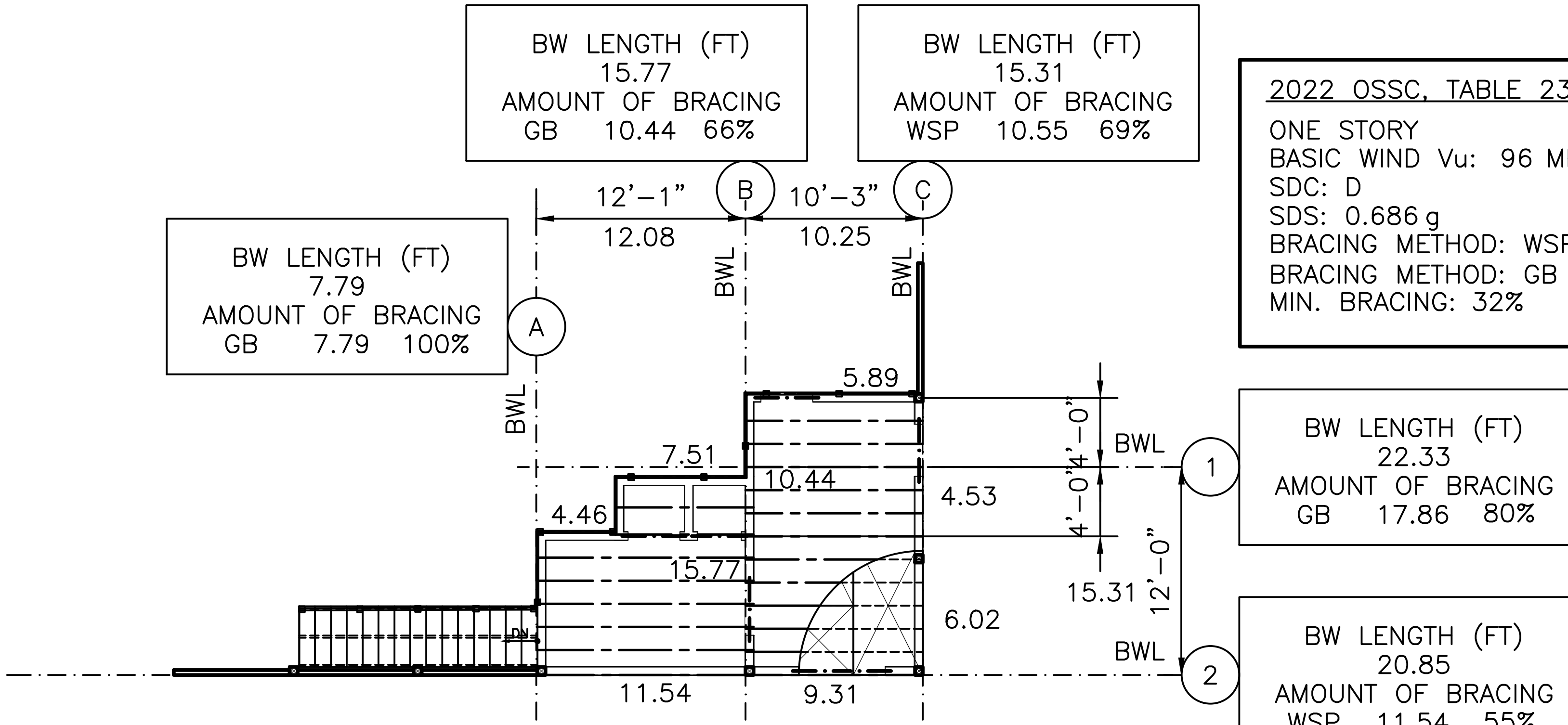
SEISMIC LATERAL CALCULATIONS
ASCE 7-16
SECTION 12.8 EQUIVALENT LATERAL FORCE PROCEDURE (ELF), p. 101

REVISIONS | BY

# A NEW STORAGE POLE BUILDING
23100 SW 82nd AVE.
TUALATIN, OR
SEISMIC & GRAVITY (VERT.) ROOF PLAN

CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengineeringdesign.com

DATE 11.20.2023
SCALE AS SHOWN
DRAWN WEB
SHEET SC2.0




| 2022 OSSC, TABLE 2308.6.1 |
|---|
| ONE STORY |
| BASIC WIND Vu: 96 MPH |
| SDC: D |
| SDS: 0.686 g |
| BRACING METHOD: WSP |
| BRACING METHOD: GB |
| MIN. BRACING: 32% |

DESIGN PER 2022 OSSC, SECTION 2308, CONVENTIONAL LIGHT FRAMING

# B OFFICE LATERAL DESIGN

SCALE: 3/32"=1'–0"

N

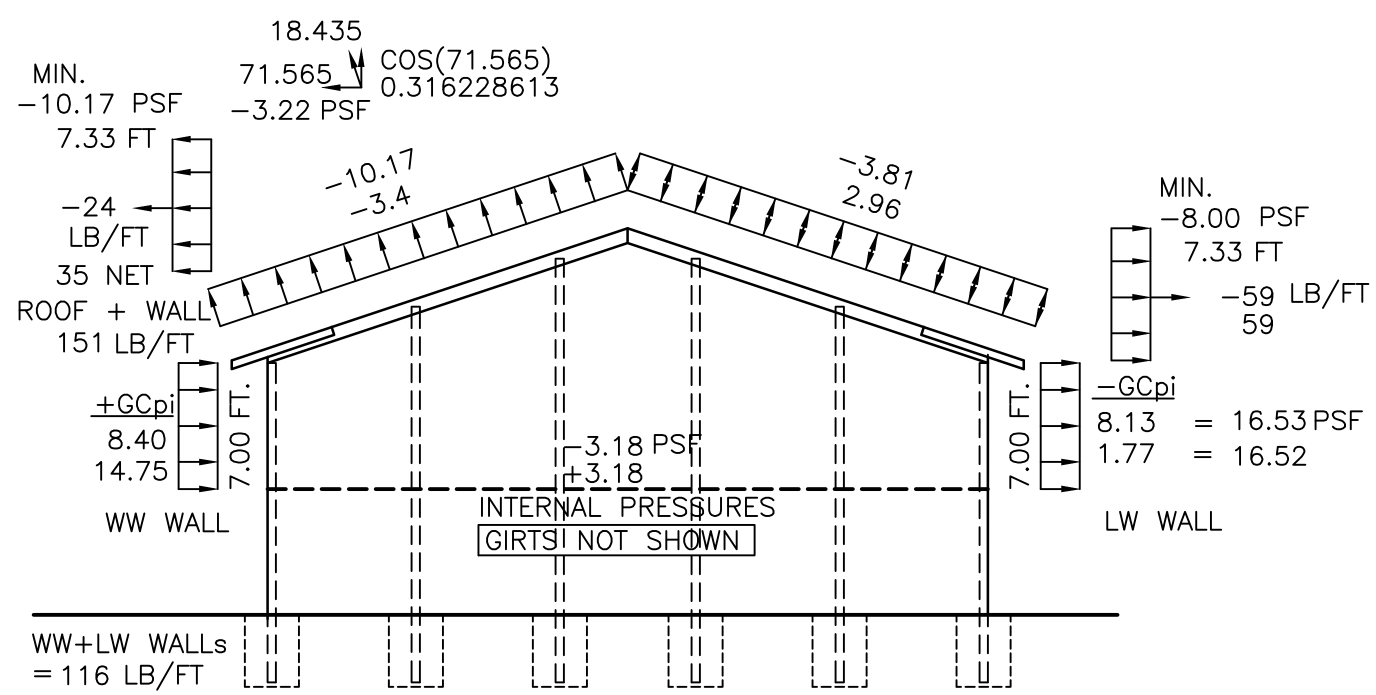
## WIND PRESSURES

NORMAL TO RIDGE

| WINDWARD WALL | +GCpi | –GCpi |
|---|---|---|
| h= (FT) | | |
| 0.00 | 8.40 | 14.75 |
| 15.00 | 8.40 | 14.75 |
| 20.00 | 9.12 | 15.48 |
| 21.69 | 9.33 | 15.69 |
| he: 14 | 8.40 | 14.75 |
| h: 17.79 | 8.83 | 15.19 |

MIN. 16 PSF * WALL AREA & 8 PSF * ROOF AREA PROJECTED ONTO A VERTICAL PLANE NORMAL TO THE ASSUMED WIND DIRECTION

| | +GCpi | –GCpi |
|---|---|---|
| LEEWARD | –10.86 | –4.33 |
| SIDE WALLS | –13.68 | –7.33 |
| ROOF | | |
| ROOF (WINDWARD), 1 | –10.17 | –3.81 |
| ROOF (WINDWARD), 2 | –3.4 | 2.96 |
| ROOF (LEEWARD) | –11.71 | –5.36 |




NORMAL TO RIDGE

# A EAST ELEV

SCALE: 3/32"=1'–0"

SEISMIC CONTROLS!

WIND LATERAL: ASCE–7–16, CH. 27, DIRECTIONAL PROCEDURE, PART 1, p. 273

PRELIMINARY NOT FOR CONSTRUCTION

2022 OSSC
TABLE 1609.3
RISK CATEGORY: II
BENTON COUNTY
BASIC DESIGN WIND SPEED: 96 MPH

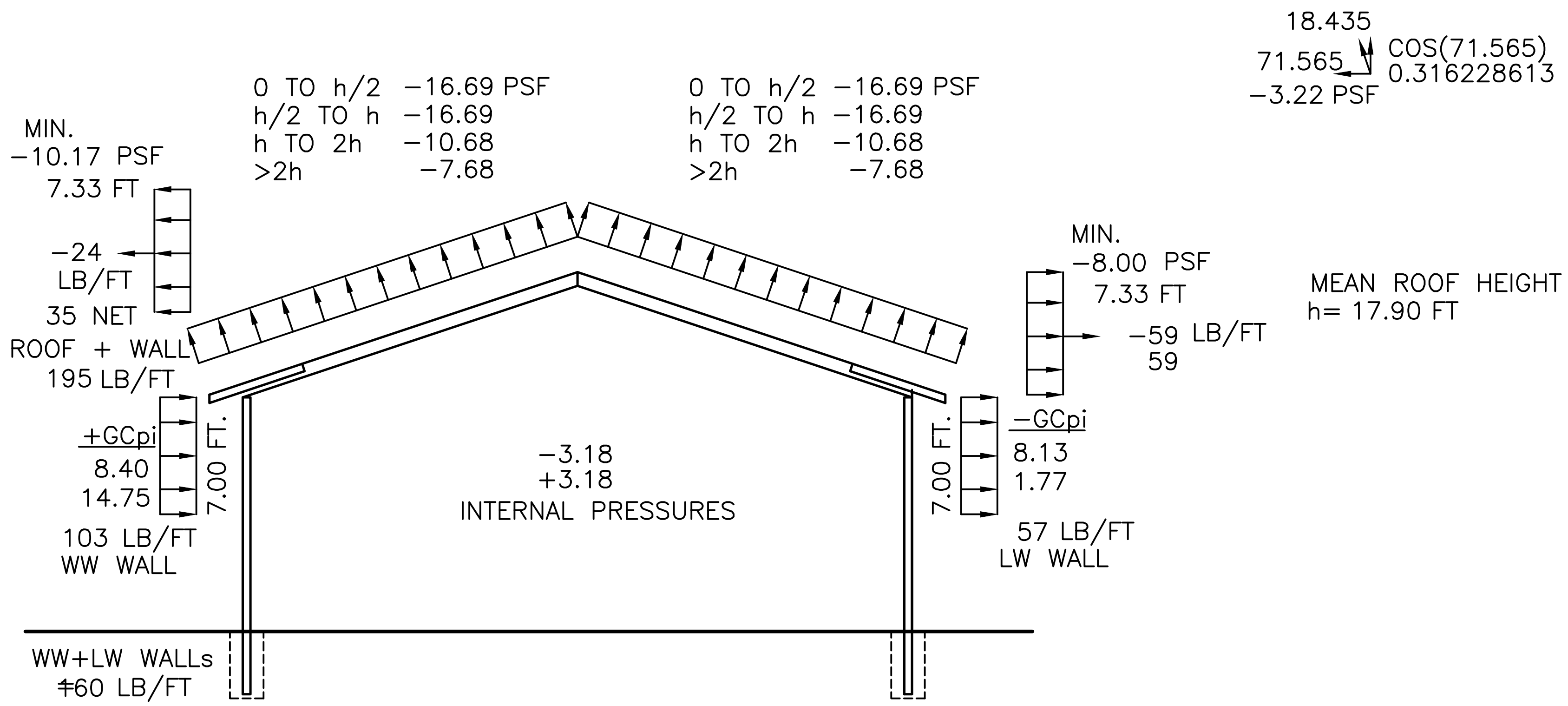
NOTE: ENCLOSURE CLASSIFICATION: PARTIALLY OPEN
SAME INTERNAL PRESSURE COEFFICIENTS AS ENCLOSED.

| REVISIONS | BY |
|---|---|
| | |

A NEW STORAGE POLE BUILDING
23100 SW 82nd AVE.
TUALATIN, OR
WIND EAST ELEVATION


CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengineeringdesign.com


DATE 11.20.2023
SCALE AS SHOWN
DRAWN WEB
SHEET SC3.0




PARALLEL TO RIDGE

# (B) TRANSVERSE SECT.

SCALE: 3/32"=1'-0"

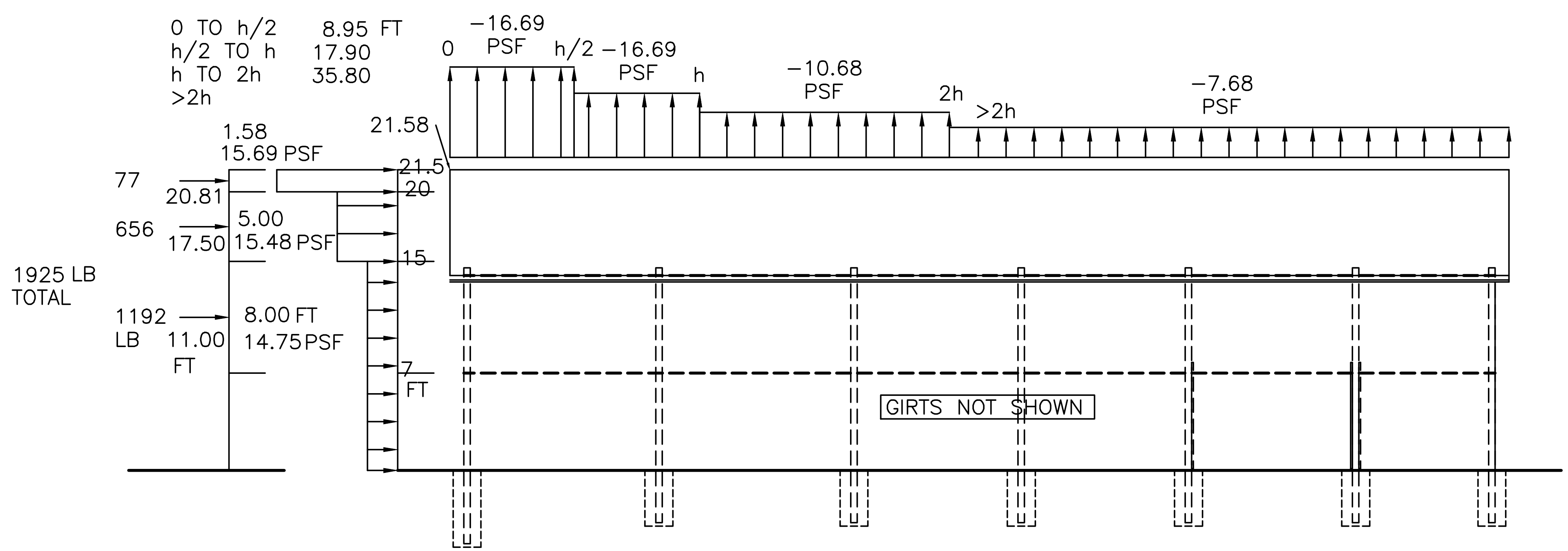
## WIND PRESSURES

PARALLEL TO RIDGE

| WINDWARD WALL | h= (FT) | +GCpi | -GCpi |
|---|---|---|---|
| | 0.00 | 8.40 | 14.75 |
| | 15.00 | 8.40 | 14.75 |
| | 20.00 | 9.12 | 15.48 |
| | 21.69 | 9.33 | 15.69 |
| | he: 14 | 8.40 | 14.75 |
| | h: 17.79 | 8.83 | 15.19 |

MIN. 16 PSF * WALL AREA
& 8 PSF * ROOF AREA PROJECTED
ONTO A VERTICAL PLANE NORMAL
TO THE ASSUMED WIND DIRECTION

| | | +GCpi | -GCpi |
|---|---|---|---|
| LEEWARD | | -8.13 | -1.77 |
| SIDE WALLS | < NORMAL TO RIDGE | -13.68 | -7.33 |
| ROOF | | +GCpi | -GCpi |
| 0 TO h/2 | ROOF (ZONE 1), 1 | -16.69 | -10.33 |
| | ROOF (ZONE 1), 2 | -5.88 | 0.48 |
| h/2 TO h | ROOF (ZONE 2), 1 | -16.69 | -10.33 |
| | ROOF (ZONE 2), 2 | -5.88 | 0.48 |
| h TO 2h | ROOF (ZONE 3), 1 | -10.68 | -4.33 |
| | ROOF (ZONE 3), 2 | -5.88 | 0.48 |
| >2h | ROOF (ZONE 4), 1 | -7.68 | -1.32 |
| | ROOF (ZONE 4), 2 | -5.88 | 0.48 |




PARALLEL TO RIDGE

# (A) SOUTH ELEV

SCALE: 3/32"=1'-0"

SEISMIC CONTROLS!

WIND LATERAL: ASCE-7-16, CH. 27,
DIRECTIONAL PROCEDURE, PART 1.
p. 273

2022 OSSC
TABLE 1609.3
RISK CATEGORY: II
BENTON COUNTY
BASIC DESIGN WIND SPEED: 96 MPH

NOTE: ENCLOSURE CLASSIFICATION:
PARTIALLY OPEN
SAME INTERNAL PRESSURE
COEFFICIENTS AS ENCLOSED.

| REVISIONS | BY |
|---|---|
| | |

# A NEW STORAGE POLE BUILDING
23100 SW 82nd AVE.
TUALATIN, OR

WIND SOUTH ELEV. & TRANSVERSE SECT.

CIVIL ENGINEERING DESIGN
Design for the Human Environment
WILLIAM E. BARLOW, P.E.
P.O. BOX 2023
CORVALLIS, OR 97339
541-929-8111
www.civilengineeringdesign.com

DATE 11.20.2023
SCALE AS SHOWN
DRAWN WEB
SHEET
SC3.1

# ATC Hazards by Location

## Search Information

**Coordinates:** 44.56822, -123.313783

**Elevation:** 285 ft

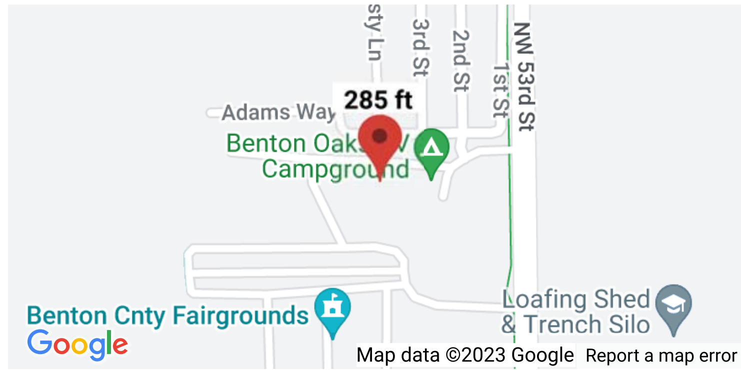
**Timestamp:** 2023-11-15T16:32:05.343Z

**Hazard Type:** Seismic

**Reference Document:** ASCE7-16

**Risk Category:** II

**Site Class:** D




## Basic Parameters

| Name | Value | Description |
|---|---|---|
| $S_S$ | 0.904 | $MCE_R$ ground motion (period=0.2s) |
| $S_1$ | 0.478 | $MCE_R$ ground motion (period=1.0s) |
| $S_{MS}$ | 1.029 | Site-modified spectral acceleration value |
| $S_{M1}$ | * null | Site-modified spectral acceleration value |
| $S_{DS}$ | 0.686 | Numeric seismic design value at 0.2s SA |
| $S_{D1}$ | * null | Numeric seismic design value at 1.0s SA |

* See Section 11.4.8

## Additional Information

| Name | Value | Description |
|---|---|---|
| SDC | * null | Seismic design category |
| $F_a$ | 1.138 | Site amplification factor at 0.2s |
| $F_v$ | * null | Site amplification factor at 1.0s |
| $CR_S$ | 0.868 | Coefficient of risk (0.2s) |
| $CR_1$ | 0.861 | Coefficient of risk (1.0s) |
| PGA | 0.43 | $MCE_G$ peak ground acceleration |
| $F_{PGA}$ | 1.17 | Site amplification factor at PGA |
| $PGA_M$ | 0.503 | Site modified peak ground acceleration |
| $T_L$ | 16 | Long-period transition period (s) |

| | | |
|---|---|---|
| SsRT | 0.904 | Probabilistic risk-targeted ground motion (0.2s) |
| SsUH | 1.041 | Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years) |
| SsD | 1.5 | Factored deterministic acceleration value (0.2s) |
| S1RT | 0.478 | Probabilistic risk-targeted ground motion (1.0s) |
| S1UH | 0.555 | Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years) |
| S1D | 0.787 | Factored deterministic acceleration value (1.0s) |
| PGAd | 0.676 | Factored deterministic acceleration value (PGA) |

* See Section 11.4.8

*The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.*

*Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.*

## Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.

| | | | | | |
|---|---|---|---|---|---|
| 2022 OSSC & ASCE 7-16 | | | Project: | Storage Building | |
| EQUIVALENT LATERAL FORCE PROCEDURE (12.8.1), p. 71 | | | Date: | 11.15.2023 | |
| | | | | Input | Results |

| | | |
|---|---|---|
| Code: | OSSC | <= Pull Down |
| Occupancy Category | II | <= Pull Down, (OSSC Table 1604.5), p. 350: I, II, III OR IV |
| $T_a=C_t(h_n)^x$ | Equation (12.8-7) | |
| Structure Type | All other Structures | |
| $C_t$ = | 0.020 | (Table 12.8-2), p. 102 |
| x = | 0.75 | (Table 12.8-2), p. 102 |
| $h_n$ = | 18.0 | ft |
| $T_a$ = | 0.17 | sec |
| | | |
| ASCE 7-16, 20.3 SITE CLASS DEFINITIONS, 20.3.1, Exception | | |
| Site Class = | D | |
| $S_s$ = | 0.904 | From ATC Basic Parameters |
| $S_1$= | 0.478 | From ATC Basic Parameters; S1>0.2, SITE SPECIFIC REQ'D; Use Expection |
| | | $S_s$= 0.904 |
| $F_a$= | 1.138 | From ATC Additional Information |
| $F_v$= | 1.800 | From Table 11.4.2 See right=> |
| | | |
| $S_{MS}=F_a*S_s$ | 1.029 | (11.4-1) |
| $S_{M1}=F_v*S_1$ | 1.291 | (11.4-2) Increased 50%, Supplement 3, Chapter 11 |
| | | |
| $S_{DS}$= 2/3*$S_{MS}$ | 0.686 | (11.4-3) |
| $S_{D1}$=2/3*$S_{M1}$ | 0.860 | (11.4-4) |

ASCE 7-16, 20.1 [p. 203], Where the soil properties are not known in sufficient detail to determine the site class, Site Class D, subject to the requirements of Section 11.4.4, shall be used unless the Authority Having Jurisdiction or geotechnical data determine that Site Class E or F soils are present at the site.

$S_1$= 0.478

**Table 11.4-1 Short-Period Site Coefficient, Fa**

| Site Class | Ss<= 0;.25 | Ss= 0.5 | Ss= 0.75 | Ss= 1 | Ss= 1.25 | Ss>= 1.5 |
|---|---|---|---|---|---|---|
| A | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| B | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| C | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 |
| D | 1.6 | 1.4 | 1.2 | 1.1 | 1 | 1 |
| E | | | | See 11.4.8 | See 11.4.8 | See 11.4.8 |
| F | See 11.4.8 | See 11.4.8 | See 11.4.8 | See 11.4.8 | See 11.4.8 | See 11.4.8 |

| | | | |
|---|---|---|---|
| Find: Fa= | Linear Interpolation | | |
| Ssa= | 0.750 | Fa1= | 1.2 |
| $S_s$= | 0.904 | **Fa=** | **1.2** |
| Ssb= | 1.000 | Fa2= | 1.2 |

**Table 11.4-2 Long-Period Site Coefficient, Fv**

| Site Class | $S_1$<= 0.1 | $S_1$= 0.2 | $S_1$= 0.3 | $S_1$= 0.4 | $S_1$= 0.5 | $S_1$>= 0.6 |
|---|---|---|---|---|---|---|
| A | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| B | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| C | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 |
| D | 2.4 | 2.2 | 2 | 1.9 | 1.8 | 1.7 |
| E | 4.2 | See 11.4.8 | See 11.4.8 | See 11.4.8 | See 11.4.8 | See 11.4.8 |
| F | See 11.4.8 | See 11.4.8 | See 11.4.8 | See 11.4.8 | See 11.4.8 | See 11.4.8 |

| | | | |
|---|---|---|---|
| Find: Fv= | Linear Interpolation | | |
| S1a= | 0.400 | Fv1= | 1.9 |
| $S_1$= | 0.478 | **Fv=** | **1.8** |
| S1b= | 0.500 | Fv2= | 1.8 |

| | | |
|---|---|---|
| $S_1$ = | 0.478 | S1>0.2, OKAY! |
| $T_a$ = | 0.175 | s |
| $T_s = S_{D1}/S_{DS}$ = | 1.255 | |
| Ta/Ts = | 0.139 | <=1.5 OKAY! IF Ta/Ts<=1.5, THEN USE Cs Equation 12.8-2, p. 101 |
| $T_L$ > (T >= 1.5 Ts) | $T_L$=16s | |
| 1.5 $T_s$ = | 1.882 | |
| V=Cs(W) (12.8-1) | | |
| Calculation of Seismic Response Coefficient (12.8.1.1), p. 101 | | |
| $S_{DS}$ = | 0.686 | g, EXCEPTION 2. ABOVE |
| $S_{D1}$ = | 0.860 | g, EXCEPTION 2. ABOVE |
| R = | 1.5 | (Table 12.2-1), p. 92 |
| I = | 1.00 | (Table 1.5.-2), p. 4 |
| | | |
| Cs = | 0.4572 | (12.8-2), p. 101 |
| $T_L$ = | 16 | sec (Figure 22-14), p. 225 |
| Cs \|> = | 3.2819 | for T<$T_L$ (12.8-3), p. 101 |
| **or** | | |
| Cs \|> = | 300.44 | for T>$T_L$ (12.8-4), p. 101 |
| Cs \|< = | 0.0302 | (12.8-5), p. 101 |
| Cs \|< = | 0.3155 | (12.8-6), p. 101 |
| | | |
| Seismic Design Category | | |
| SDC DS: | D | |
| SDC D1: | D | |

$S_S$ = mapped MCE, 5 percent damped, spectral response acceleration parameter at short periods as defined in Section 11.4.1
$S_1$ = mapped MCE, 5 percent damped, spectral response acceleration parameter at a period of 1 s as defined in Section 11.4.1
$S_{aM}$ = the site-specific MCE spectral response acceleration at any period
$S_{DS}$ = design, 5 percent damped, spectral response acceleration parameter at short periods as defined in Section 11.4.4
$S_{D1}$ = design, 5 percent damped, spectral response acceleration parameter at a period of 1 s as defined in Section 11.4.4
$S_{MS}$ = the MCE, 5 percent damped, spectral response acceleration at short periods adjusted for site class effects as defined in Section 11.4.3

ASCE 7-16, 11.4.4 [p. 84] Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCER ) Spectral Response Acceleration Parameters. The MCER spectral response acceleration parameters for short periods ($S_{MS}$) and at 1 s (SM1), adjusted for site class effects, shall be determined by Eqs. (11.4-1) and (11.4-2), respectively.
$S_{MS}$ = Fa$S_S$ (11.4-1)
$S_{M1}$ = Fv$S_1$ (11.4-2) Increased 50% per Exception Supplement 3, Chapter 11
where
$S_S$ = the mapped MCER spectral response acceleration parameter at short periods as determined in accordance with Section 11.4.2, and
$S_1$ = the mapped MCER spectral response acceleration parameter at a period of 1 s as determined in accordance with Section 11.4.2
where site coefficients Fa and Fv are defined in Tables 11.4-1 and 11.4-2, respectively. Where Site Class D is selected as the default site class per Section 11.4.3, the value of Fa shall not be less than 1.2.

**Note:**

| | | |
|---|---|---|
| $C_t$ = | (Table 12.8-2), p. 102 | Steel frame: 0.028, Concrete frame: 0.016, Steel ecc. braced frame: Table 12.2.1, Steel buckling-restrained braced frame: 0.03, All others: 0.02 |
| x = | (Table 12.8-2), p. 102 | Steel frame: 0.8, Concrete frame: 0.9, Steel ecc. braced frame: Table 12.8.2, Steel buckling-restrained braced frame: 0.75, All others: 0.75 |

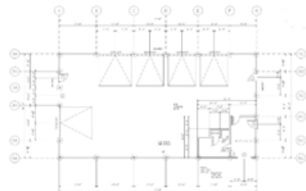
**Exposure Classification**

ASCE 7-16, 26.12, p. 270

Input
Result

Project: 110 SW 53rd ST
Date: 11.14.2023

**Buliding Dimensions**



Length, L= 74.00 ft
Width, W= 40.00 ft
Average Roof Height, H= 18.00 ft

**Wall 1:**

Length 1= 74.00 ft
Height 1= 14.00 ft
Wall 1 Area= 1036.00 $ft^2$

| Opening 1: | | Opening 2: | | Opening 3: | |
|---|---|---|---|---|---|
| width = | 12.00 ft | width = | 12.00 ft | width = | 12.00 ft |
| height = | 12.00 ft | height = | 10.00 ft | height = | 10.00 ft |
| Area 1 = | 144.00 $ft^2$ | Area 2 = | 120.00 $ft^2$ | Area 3 = | 120.00 $ft^2$ |

| Opening 4: | | Opening 5: | | Opening 6: | |
|---|---|---|---|---|---|
| width = | 12.00 ft | width = | ft | width = | ft |
| height = | 10.00 ft | height = | ft | height = | ft |
| Area 4 = | 120.00 $ft^2$ | Area 5 = | 0.00 $ft^2$ | Area 6 = | 0.00 $ft^2$ |

| | | |
|---|---|---|
| $A_o$= | 504.00 $ft^2$ | $A_o$=Total area of openings in a wall that receives positive external pressure, in $ft^2$ |
| $A_g$= | 1036.00 $ft^2$ | $A_g$=gross area of that wall which Ao is identified, in $ft^2$ |
| $A_{o/Ag}$= | 0.49 $ft^2$ | If > 0.8, then OPEN |
| $0.01A_g$= | 10.36 $ft^2$ | |
| | 4.00 $ft^2$ | 4.00 $ft^2$ Is lesser |
| $A_{oi}$= | 219.00 $ft^2$ | Sum of the areas of openings in the building envelope (walls and roof) not including Ao, in $ft^2$ |
| $A_{gi}$= | 2156.00 $ft^2$ | Sum of the gross surface areas of the building envelope (walls and roof) not including Ag, in $ft^2$ |
| $A_{oi}/A_{og}$= | 0.1 <=0.2? | YES |
| $1.1*A_{oi}$= | 240.9 | 1.1 * Sum of the areas of openings in the building envelope (walls and roof) not including Ao, in ft2 |
| **Wall 1:** | | |

**Wall 2:**

Length 2= 40.00 ft
Height 2= 14.00 ft
Wall 2 Area= 560.00 $ft^2$

| Opening 1: | | Opening 2: | | Opening 3: | |
|---|---|---|---|---|---|
| width = | 3.00 ft | width = | 12.00 ft | width = | ft |
| height = | 6.67 ft | height = | 12.00 ft | height = | ft |
| Area 1 = | 20.00 $ft^2$ | Area 2 = | 144.00 $ft^2$ | Area 3 = | 0.00 $ft^2$ |

| Opening 4: | | Opening 5: | | Opening 6: | |
|---|---|---|---|---|---|
| width = | ft | width = | ft | width = | ft |
| height = | ft | height = | ft | height = | ft |
| Area 4 = | 0.00 $ft^2$ | Area 5 = | 0.00 $ft^2$ | Area 6 = | 0.00 $ft^2$ |

| | | |
|---|---|---|
| $A_o$= | 164.00 $ft^2$ | $A_o$=Total area of openings in a wall that receives positive external pressure, in $ft^2$ |
| $A_g$= | 560.00 $ft^2$ | $A_g$=gross area of that wall which Ao is identified, in $ft^2$ |
| $A_{o/Ag}$= | 0.29 $ft^2$ | If > 0.8, then OPEN |
| $0.01A_g$= | 5.60 $ft^2$ | |
| | 4.00 $ft^2$ | 4.00 $ft^2$ Is lesser |
| $A_{oi}$= | 763.01 $ft^2$ | Sum of the areas of openings in the building envelope (walls and roof) not including Ao, in $ft^2$ |
| $A_{gi}$= | 2632.00 $ft^2$ | Sum of the gross surface areas of the building envelope (walls and roof) not including Ag, in $ft^2$ |
| $A_{oi}/A_{og}$= | 0.3 <=0.2? | NO |
| $1.1*A_{oi}$= | 839.3 | 1.1 * Sum of the areas of openings in the building envelope (walls and roof) not including Ao, in ft2 |

**Exposure Classification**
ASCE 7-16, 26.12, p. 270

Input
Result

| | |
|---|---|
| Project: | 110 SW 53rd ST |
| Date: | 11.14.2023 |

**Wall 3:**

| | | |
|---|---|---|
| Length 3= | 74.00 | ft |
| Height 3= | 14.00 | ft |
| Wall 3 Area= | 1036.00 | $ft^2$ |

| | Opening 1: | | Opening 2: | | Opening 3: | |
|---|---|---|---|---|---|---|
| width = | 5.00 ft | width = | ft | width = | ft |
| height = | 3.00 ft | height = | ft | height = | ft |
| Area 1 = | 15.00 $ft^2$ | Area 2 = | 0.00 $ft^2$ | Area 3 = | 0.00 $ft^2$ |

| | Opening 4: | | Opening 5: | | Opening 6: | |
|---|---|---|---|---|---|---|
| width = | ft | width = | ft | width = | ft |
| height = | ft | height = | ft | height = | ft |
| Area 4 = | 0.00 $ft^2$ | Area 5 = | 0.00 $ft^2$ | Area 6 = | 0.00 $ft^2$ |

| | | | |
|---|---|---|---|
| $A_o$= | 15.00 $ft^2$ | | $A_o$=Total area of openings in a wall that receives positive external pressure, in $ft^2$ |
| $A_g$= | 1036.00 $ft^2$ | | $A_g$=gross area of that wall which Ao is identified, in $ft^2$ |
| $A_o/A_g$= | 0.01 $ft^2$ | | If > 0.8, then OPEN |
| $0.01A_g$= | 10.36 $ft^2$ | | |
| | 4.00 $ft^2$ | | 4.00 $ft^2$ Is lesser |
| $A_{oi}$= | 708.00 $ft^2$ | | Sum of the areas of openings in the building envelope (walls and roof) not including Ao, in $ft^2$ |
| $A_{gi}$= | 2156.00 $ft^2$ | | Sum of the gross surface areas of the building envelope (walls and roof) not including Ag, in $ft^2$ |
| $A_{oi}/A_{og}$= | 0.3 | <=0.2? | NO |
| $1.1*A_{oi}$= | 778.8 | | 1.1 * Sum of the areas of openings in the building envelope (walls and roof) not including Ao, in ft2 |

**Wall 4:**

| | | |
|---|---|---|
| Length 4= | 40.00 | ft |
| Height 4= | 14.00 | ft |
| Wall 4 Area= | 560.00 | $ft^2$ |

| | Opening 1: | | Opening 2: | | Opening 3: | |
|---|---|---|---|---|---|---|
| width = | 3.00 ft | width = | 3.00 ft | width = | ft |
| height = | 6.67 ft | height = | 6.67 ft | height = | ft |
| Area 1 = | 20.00 $ft^2$ | Area 2 = | 20.00 $ft^2$ | Area 3 = | 0.00 $ft^2$ |

| | Opening 4: | | Opening 5: | | Opening 6: | |
|---|---|---|---|---|---|---|
| width = | ft | width = | ft | width = | ft |
| height = | ft | height = | ft | height = | ft |
| Area 4 = | 0.00 $ft^2$ | Area 5 = | 0.00 $ft^2$ | Area 6 = | 0.00 $ft^2$ |

| | | | |
|---|---|---|---|
| $A_o$= | 40.00 $ft^2$ | | $A_o$=Total area of openings in a wall that receives positive external pressure, in $ft^2$ |
| $A_g$= | 560.00 $ft^2$ | | $A_g$=gross area of that wall which Ao is identified, in $ft^2$ |
| $A_o/A_g$= | 0.07 $ft^2$ | | If > 0.8, then OPEN |
| $0.01A_g$= | 5.60 $ft^2$ | | |
| | 4.00 $ft^2$ | | 4.00 $ft^2$ Is lesser |
| $A_{oi}$= | 683.00 $ft^2$ | | Sum of the areas of openings in the building envelope (walls and roof) not including Ao, in $ft^2$ |
| $A_{gi}$= | 2632.00 $ft^2$ | | Sum of the gross surface areas of the building envelope (walls and roof) not including Ag, in $ft^2$ |
| $A_{oi}/A_{og}$= | 0.26 | <=0.2? | NO |
| $1.1*A_{oi}$= | 751.3 | | 1.1 * Sum of the areas of openings in the building envelope (walls and roof) not including Ao, in ft2 |

**Wall 4:**

**Roof Openings** 0.00 $ft^2$

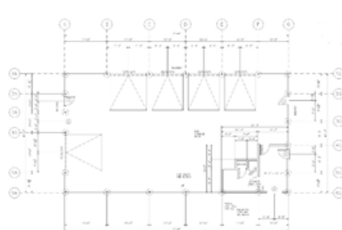
**Summary**

| | Side 1 | Side 2 | Side 3 | Side 4 | |
|---|---|---|---|---|---|
| $A_o$= | 504.00 | 164.00 | 15.00 | 40.00 | $ft^2$ |
| Smaller of 4 $ft^2$ or $0.01A_g$= | 4.00 | 4.00 | 4.00 | 4.00 | $ft^2$ |
| $A_g$= | 1036.00 | 560.00 | 1036.00 | 560.00 | $ft^2$ |
| $0.8A_g$= | 828.80 | 448.00 | 828.80 | 448.00 | $ft^2$ |
| $A_o/A_g$= | 0.49 | 0.29 | 0.01 | 0.07 | $ft^2$ |
| $A_{oi}$= | 219.00 | 763.01 | 708.00 | 683.00 | $ft^2$ |
| $A_{gi}$= | 2156.00 | 2632.00 | 2156.00 | 2632.00 | $ft^2$ |
| $A_{oi}/A_{og}$= | 0.10 | 0.29 | 0.33 | 0.26 | $ft^2$ |
| $A_{oi}/A_{og}$<0.2?= | NO | NO | NO | NO | |
| $1.10A_{oi}$= | 240.90 | 839.31 | 778.80 | 751.30 | $ft^2$ |

**Building Enclosure Classification:**

| | | | | | |
|---|---|---|---|---|---|
| (1) ENCLOSED: | NO | NO | NO | NO | For each wall, if Ao<(smaller of 0.01Ag or 4 ft2) & Aoi/Aog<= 0.2 then Enclosed |
| (2) OPEN: | NO | NO | NO | NO | For each wall, if Ao>=0.8Ag then Open |
| (3) PARTIALLY ENCLOSED: | NO | NO | NO | NO | In a wall, if Ao>= (smaller of 1.10Aoi or 4 ft2) & Aoi/Aog<= 0.2 then Partially Enclosed |
| (4) PARTIALLY OPEN: | YES | YES | YES | YES | A building that does not comply with the requirements for open, partially enclosed, or enclosed buildings. |

| | GCpi | GCpi | GCpi | GCpi |
|---|---|---|---|---|
| (1) ENCLOSED: | NA | NA | NA | NA |
| (2) OPEN: | NA | NA | NA | NA |
| (3) PARTIALLY ENCLOSED: | NA | NA | NA | NA |
| (4) PARTIALLY OPEN: | +/- 0.18 | +/- 0.18 | +/- 0.18 | +/- 0.18 |



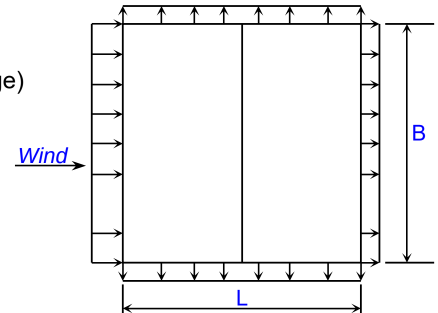
Use: **PARTIALLY OPEN** **GCpi +/- 0.18**

## WIND LOADING ANALYSIS - Main Wind-Force Resisting System
### Per ASCE 7-16 Code for Enclosed or Partially Enclosed Buildings
### Using Direction Procedure (Ch. 27, Part 1) for Buildings of Any Height

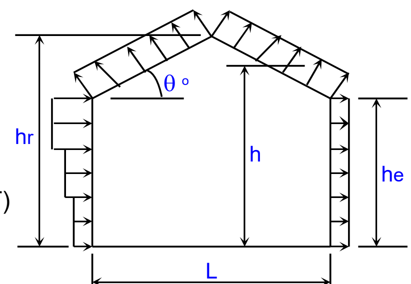
| Job Name: | 110 SW 53rd St | Subject: | MWFRS | Date: | 11,14,2023 |
|---|---|---|---|---|---|
| Job Number: | 23024 | Originator: | WEB | Checker: | WEB |

**Input Data:**

| | | |
|---|---|---|
| Wind Direction = | Normal | (Normal or Parallel to building ridge) |
| Wind Speed, V = | 96 | mph (2022 OSSC) |
| Risk Category = | II | (2022 OSSC) |
| Exposure Category = | C | (Sect. 26.7) |
| Roof Pitch = | 4 | :12 |
| Ridge Height, hr = | 21.69 | ft. (hr >= he) |
| Eave Height, he = | 14.00 | ft. (he <= hr) |
| Building Width, L = | 40.00 | ft. (Normal to Building Ridge) |
| Building Length, B = | 74.00 | ft. (Parallel to Building Ridge) |
| Roof Type = | Gable | (Gable or Monoslope) |
| Topo. Factor, Kzt = | 1.00 | (Sect. 26.8 & Table 26.8-1) |
| Direct. Factor, Kd = | 0.85 | (Table 26.6-1) |
| Enclosure Classification = | Partially Open | (Table 26.13-1) |
| Hurricane Region? | N | |
| Damping Ratio, β = | 0.050 | (Suggested Range = 0.010-0.070) |
| Period Coef., Ct = | 0.0200 | (Suggested Range = 0.020-0.035) |
| | | (Assume: T = Ct*h^(3/4) , and f = 1/T) |



**Plan**



**Elevation**

L = 40 ft.
B = 74 ft.

**Resulting Parameters and Coefficients:**

| | | | | |
|---|---|---|---|---|
| Roof Angle, θ = | 18.43 | deg. | | |
| Mean Roof Ht., h = | 17.85 | ft. (h = (hr+he)/2, for roof angle >10 deg.) | | |
| Windward Wall Cp = | 0.80 | (Fig. 27.3-1) | | |
| Leeward Wall Cp = | -0.50 | (Fig. 27.3-1) | | |
| Side Walls Cp = | -0.70 | (Fig. 27-3.1) | | |
| Windward Roof Cp = | -0.47 | | (Fig. 27-3.1) | (Condition #1) |
| Windward Roof Cp = | -0.01 | | (Fig. 27-3.1) | (Condition #2) |
| Leeward Roof Cp = | -0.57 | | (Fig. 27-3.1) | |
| | | | (Fig. 27-3.1) | |
| +GCpi Coef. = | 0.18 | (Table 26.13-1) | (positive internal pressure) | |
| -GCpi Coef. = | -0.18 | (Table 26.13-1) | (negative internal pressure) | |

Internal Press. = qh*+/-GCpi
3.18 -3.18

If z <= 15 then: Kz = 2.01*(15/zg)^(2/α) , If z > 15 then: Kz = 2.01*(z/zg)^(2/α) (Table 27.3-1)

α = 9.50 zg = 900 (Table 26.9-1)

Kh = 0.88 (Kh = Kz evaluated at z = h)

Velocity Pressure: qz = 0.00256*Kz*Kzt*Kd*V^2*I (Eq. 26.10-1)

| | | | | | |
|---|---|---|---|---|---|
| qh = | 17.66 | psf | qh = 0.00256*Kh*Kzt*Kd*V^2 (qz evaluated at z = h) | | |
| Ratio h/L = | 0.446 | | freq., f = | 5.759 | hz. (f >= 1, Rigid structure) |
| Gust Factor, G = | 0.850 | (Sect. 26.9) | | | |

Design Net External Wind Pressures (Sect. 27.4):

p = qz*G*Cp - qi*(+/-GCpi) for windward wall (psf), where: qi =qh (Eq. 27.3-1)

p = qh*G*Cp - qi*(+/-GCpi) for leeward wall, sidewalls, and roof (psf), where: qi = qh (Eq. 27.3-1)

| Normal to Ridge Wind Load Tabulation for MWFRS - Buildings of Any Height | | | | | | |
|---|---|---|---|---|---|---|
| Surface | z (ft.) | Kz | qz (psf) | Cp | p = Net Design Press. (psf) (w/ +GCpi) | (w/ -GCpi) |
| Windward Wall | 0 | 0.85 | 17.02 | 0.80 | 8.40 | 14.75 |
| | 15.00 | 0.85 | 17.02 | 0.80 | 8.40 | 14.75 |
| | 20.00 | 0.90 | 18.09 | 0.80 | 9.12 | 15.48 |
| For z = hr: | 21.69 | 0.92 | 18.40 | 0.80 | 9.33 | 15.69 |
| For z = he: | 14.00 | 0.85 | 17.02 | 0.80 | 8.40 | 14.75 |
| For z = h: | 17.85 | 0.88 | 17.66 | 0.80 | 8.83 | 15.19 |
| Leeward Wall | All | - | - | -0.50 | -10.68 | -4.33 |
| Side Walls | All | - | - | -0.70 | -13.68 | -7.33 |
| Roof (windward) cond. 1 | - | - | - | -0.47 | -10.17 | -3.81 |
| Roof (windward) cond. 2 | - | - | - | -0.01 | -3.40 | 2.96 |
| | - | - | - | | | |
| Roof (leeward) | - | - | - | -0.57 | -11.71 | -5.36 |
| | - | - | - | | | |

Notes: 1. (+) and (-) signs signify wind pressures acting toward & away from respective surfaces.
2. Section 27.1.5, the min. wind load for MWFRS shall not be less than 16 psf; 8 psf roof-proj. onto vert. plane

**Determination of Gust Effect Factor, G:**

Is Building Flexible? | No | f >=1 Hz.

**1:** Simplified Method for Rigid Building

G = 0.850

Parameters Used in Both Item #2 and Item #3 Calculations (from Table 26.9-1):

| | | |
|---|---|---|
| α^ = | 0.105 | |
| b^ = | 1.00 | |
| α(bar) = | 0.154 | |
| b(bar) = | 0.65 | |
| c = | 0.20 | |
| l = | 500 | ft. |
| ε(bar) = | 0.200 | |
| z(min) = | 15 | ft. |

Calculated Parameters Used in Both Rigid and/or Flexible Building Calculations:

| | | |
|---|---|---|
| z(bar) = | 15.00 | = 0.6*h , but not < z(min) , ft. Table 26.9-1 |
| Iz(bar) = | 0.228 | = c*(33/z(bar))^(1/6) , Eq. 26.9-7 |
| Lz(bar) = | 427.06 | = l*(z(bar)/33)^(ε(bar)) , Eq. 26.9-9 |
| gq = | 3.4 | (3.4, per Sect. 26.9.4) |
| gv = | 3.4 | (3.4, per Sect. 26.9.4) |
| gr = | 4.588 | = (2*(LN(3600*f)))^(1/2)+0.577/(2*LN(3600*f))^(1/2) , Eq. 26.9-11 |
| Q = | 0.898 | = (1/(1+0.63*((B+h)/Lz(bar))^0.63))^(1/2) , Eq. 26.9-8 |

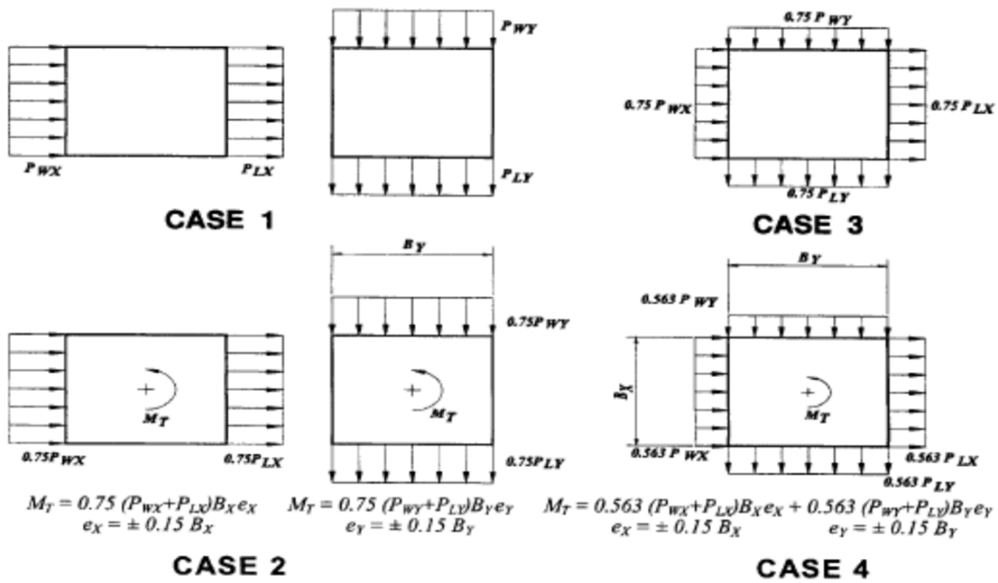
**2:** Calculation of G for Rigid Building

G = 0.872 = 0.925*((1+1.7*gq*Iz(bar)*Q)/(1+1.7*gv*Iz(bar))) , Eq. 26.9-6

**3:** Calculation of Gf for Flexible Building

| | | |
|---|---|---|
| β = | 0.050 | Damping Ratio |
| Ct = | 0.020 | Period Coefficient |
| T = | 0.174 | = Ct*h^(3/4) , sec. (Approximate fundamental period) |
| f = | 5.759 | = 1/T , Hz. (Natural Frequency) |
| V(fps) = | N.A. | = V(mph)*(88/60) , ft./sec. |
| V(bar,zbar) = | N.A. | = b(bar)*(z(bar)/33)^(α(bar))*V*(88/60) , ft./sec. , Eq. 26.9-16 |
| N1 = | N.A. | = f*Lz(bar)/(V(bar,zbar)) , Eq. 26.9-14 |
| Rn = | N.A. | = 7.47*N1/(1+10.3*N1)^(5/3) , Eq. 26.9-13 |
| ηh = | N.A. | = 4.6*f*h/(V(bar,zbar)) |
| Rh = | N.A. | = (1/ηh)-1/(2*ηh^2)*(1-e^(-2*ηh)) for ηh>0, or = 1 for ηh=0 ,Eq. 26.9-15a, b |
| ηb = | N.A. | = 4.6*f*B/(V(bar,zbar)) |
| RB = | N.A. | = (1/ηb)-1/(2*ηb^2)*(1-e^(-2*ηb)) for ηb>0, or = 1 for ηb=0,Eq. 26.9-15a, b |
| ηd = | N.A. | = 15.4*f*L/(V(bar,zbar)) |
| RL = | N.A. | = (1/ηd)-1/(2*ηd^2)*(1-e^(-2*ηd)) for ηd>0, or = 1 for ηd=0 ,Eq. 26.9-15a, b |
| R = | N.A. | = ((1/β)*Rn*Rh*RB*(0.53+0.47*RL))^(1/2) , Eq. 26.9-12 |
| Gf = | N.A. | = 0.925*(1+1.7*Iz(bar)*(gq^2*Q^2+gr^2*R^2)^(1/2))/(1+1.7*gv*Iz(bar)) , Eq. 26.9-10 |
| Use: G = | 0.850 | |

**Figure 27.4-1 - Design Wind Load Cases of MWFRS for Buildings of All Heights**




**Case 1**: Full design wind pressure acting on the projected area perpendicular to each principal axis of the structure, considered separately along each principal axis.

**Case 2:** Three quarters of the design wind pressure acting on the projected area perpendicular to each principal axis of the structure in conjunction with a torsional moment as shown, considered separately for each principal axis.

**Case 3:** Wind pressure as defined in Case 1, but considered to act simultaneously at 75% of the specified value.

**Case 4**: Wind pressure as defined in Case 2, but considered to act simultaneously at 75% of the specified value.

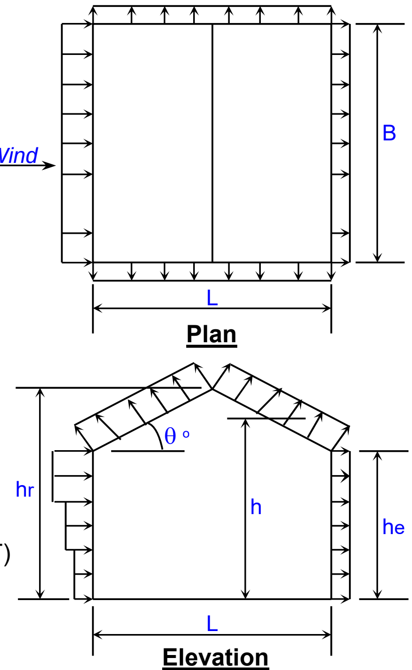
Notes: 1. Design wind pressures for windward (Pw) and leeward (PL) faces shall be determined in accordance with the provisions of Section 27.4.1 and 27.4.2 as applicable for buildings of all heights.
2. Above diagrams show plan views of building.
3. Notation:
$P_{wx}$, $P_{wy}$ = Windward face pressure acting in the X, Y principal axis, respectively.
$P_{Lx}$, $P_{Ly}$ = Leeward face pressure acting in the X, Y principal axis, respectively.
e ($e_x$, $e_y$) = Eccentricity for the X, Y principal axis of the structure, respectively.
$M_T$ = Torsional moment per unit height acting about a vertical axis of the building.

# WIND LOADING ANALYSIS - Main Wind-Force Resisting System
## Per ASCE 7-16 Code for Enclosed or Partially Enclosed Buildings
## Using Direction Procedure (Ch. 27, Part 1) for Buildings of Any Height

| Job Name: | 110 SW 53rd St | Subject: | MWFRS | Date: | 11,14,2023 |
|---|---|---|---|---|---|
| Job Number: | 23024 | Originator: | WEB | Checker: | WEB |

**Input Data:**

| | | |
|---|---|---|
| Wind Direction = | Parallel | (Normal or Parallel to building ridge) |
| Wind Speed, V = | 96 | mph (2022 OSSC) |
| Risk Category = | II | (2022 OSSC) |
| Exposure Category = | C | (Sect. 26.7) |
| Roof Pitch = | 4 | :12 |
| Ridge Height, hr = | 21.69 | ft. (hr >= he) |
| Eave Height, he = | 14.00 | ft. (he <= hr) |
| Building Width, L = | 40.00 | ft. (Normal to Building Ridge) |
| Building Length, B = | 74.00 | ft. (Parallel to Building Ridge) |
| Roof Type = | Gable | (Gable or Monoslope) |
| Topo. Factor, Kzt = | 1.00 | (Sect. 26.8 & Table 26.8-1) |
| Direct. Factor, Kd = | 0.85 | (Table 26.6-1) |
| Enclosure Classification = | Partially Open | (Table 26.13-1) |
| Hurricane Region? | N | |
| Damping Ratio, β = | 0.050 | (Suggested Range = 0.010-0.070) |
| Period Coef., Ct = | 0.0200 | (Suggested Range = 0.020-0.035) |
| | | (Assume: T = Ct*h^(3/4) , and f = 1/T) |




**Resulting Parameters and Coefficients:**

| | | | | |
|---|---|---|---|---|
| Roof Angle, θ = | 18.43 | deg. | | |
| Mean Roof Ht., h = | 17.85 | ft. (h = (hr+he)/2, for roof angle >10 deg.) | | |
| Windward Wall Cp = | 0.80 | (Fig. 27.3-1) | | |
| Leeward Wall Cp = | -0.33 | (Fig. 27.3-1) | | |
| Side Walls Cp = | -0.70 | (Fig. 27-3.1) | | |
| Roof Cp (zone #1) = | -0.90 | -0.18 | (Fig. 27-3.1) | (zone #1 for 0 to h/2) |
| Roof Cp (zone #2) = | -0.90 | -0.18 | (Fig. 27-3.1) | (zone #2 for h/2 to h) |
| Roof Cp (zone #3) = | -0.50 | -0.18 | (Fig. 27-3.1) | (zone #3 for h to 2*h) |
| Roof Cp (zone #4) = | -0.30 | -0.18 | (Fig. 27-3.1) | (zone #4 for > 2*h) |
| +GCpi Coef. = | 0.18 | (Table 26.13-1) | (positive internal pressure) | Internal Press. = qh*+/-GCpi |
| -GCpi Coef. = | -0.18 | (Table 26.13-1) | (negative internal pressure) | 3.18   -3.18 |

If z <= 15 then: Kz = 2.01*(15/zg)^(2/α) , If z > 15 then: Kz = 2.01*(z/zg)^(2/α) (Table 27.3-1)

α = 9.50   zg = 900 (Table 26.9-1)

Kh = 0.88 (Kh = Kz evaluated at z = h)

Velocity Pressure: qz = 0.00256*Kz*Kzt*Kd*V^2*I (Eq. 26.10-1)

qh = 17.66 psf   qh = 0.00256*Kh*Kzt*Kd*V^2 (qz evaluated at z = h)

Ratio h/L = 0.241   freq., f = 5.759 hz. (f >= 1, Rigid structure)

Gust Factor, G = 0.850 (Sect. 26.9)

Design Net External Wind Pressures (Sect. 27.4):

p = qz*G*Cp - qi*(+/-GCpi) for windward wall (psf), where: qi =qh (Eq. 27.3-1)

p = qh*G*Cp - qi*(+/-GCpi) for leeward wall, sidewalls, and roof (psf), where: qi = qh (Eq. 27.3-1)

| Parallel to Ridge Wind Load Tabulation for MWFRS - Buildings of Any Height | | | | | | |
|---|---|---|---|---|---|---|
| Surface | z (ft.) | Kz | qz (psf) | Cp | p = Net Design Press. (psf) (w/ +GCpi) | (w/ -GCpi) |
| Windward Wall | 0 | 0.85 | 17.02 | 0.80 | 8.40 | 14.75 |
| | 15.00 | 0.85 | 17.02 | 0.80 | 8.40 | 14.75 |
| | 20.00 | 0.90 | 18.09 | 0.80 | 9.12 | 15.48 |
| For z = hr: | 21.69 | 0.92 | 18.40 | 0.80 | 9.33 | 15.69 |
| For z = he: | 14.00 | 0.85 | 17.02 | 0.80 | 8.40 | 14.75 |
| For z = h: | 17.85 | 0.88 | 17.66 | 0.80 | 8.83 | 15.19 |
| Leeward Wall | All | - | - | -0.33 | -8.13 | -1.77 |
| Side Walls | All | - | - | -0.70 | -13.68 | -7.33 |
| Roof (zone #1) cond. 1 | - | - | - | -0.90 | -16.69 | -10.33 |
| Roof (zone #1) cond. 2 | - | - | - | -0.18 | -5.88 | 0.48 |
| Roof (zone #2) cond. 1 | - | - | - | -0.90 | -16.69 | -10.33 |
| Roof (zone #2) cond. 2 | - | - | - | -0.18 | -5.88 | 0.48 |
| Roof (zone #3) cond. 1 | - | - | - | -0.50 | -10.68 | -4.33 |
| Roof (zone #3) cond. 2 | - | - | - | -0.18 | -5.88 | 0.48 |
| Roof (zone #4) cond. 1 | - | - | - | -0.30 | -7.68 | -1.32 |
| Roof (zone #4) cond. 2 | - | - | - | -0.18 | -5.88 | 0.48 |

Notes: 1. (+) and (-) signs signify wind pressures acting toward & away from respective surfaces.
2. Section 27.1.5, the min. wind load for MWFRS shall not be less than 16 psf; 8 psf roof-proj. onto vert. plane

4. Roof zone #1 is applied for horizontal distance of 0 to h/2 from windward edge.
5. Roof zone #2 is applied for horizontal distance of h/2 to h from windward edge.
6. Roof zone #3 is applied for horizontal distance of h to 2*h from windward edge.
7. Roof zone #4 is applied for horizontal distance of > 2*h from windward edge.

**Determination of Gust Effect Factor, G:**

Is Building Flexible? No    f >=1 Hz.

**1:** Simplified Method for Rigid Building

G = 0.850

Parameters Used in Both Item #2 and Item #3 Calculations (from Table 26.9-1):

| | | |
|---|---|---|
| α^ = | 0.105 | |
| b^ = | 1.00 | |
| α(bar) = | 0.154 | |
| b(bar) = | 0.65 | |
| c = | 0.20 | |
| l = | 500 | ft. |
| ε(bar) = | 0.200 | |
| z(min) = | 15 | ft. |

Calculated Parameters Used in Both Rigid and/or Flexible Building Calculations:

| | | |
|---|---|---|
| z(bar) = | 15.00 | = 0.6*h , but not < z(min) , ft. Table 26.9-1 |
| Iz(bar) = | 0.228 | = c*(33/z(bar))^(1/6) , Eq. 26.9-7 |
| Lz(bar) = | 427.06 | = l*(z(bar)/33)^(ε(bar)) , Eq. 26.9-9 |
| gq = | 3.4 | (3.4, per Sect. 26.9.4) |
| gv = | 3.4 | (3.4, per Sect. 26.9.4) |
| gr = | 4.588 | = (2*(LN(3600*f)))^(1/2)+0.577/(2*LN(3600*f))^(1/2) , Eq. 26.9-11 |
| Q = | 0.921 | = (1/(1+0.63*((B+h)/Lz(bar))^0.63))^(1/2) , Eq. 26.9-8 |

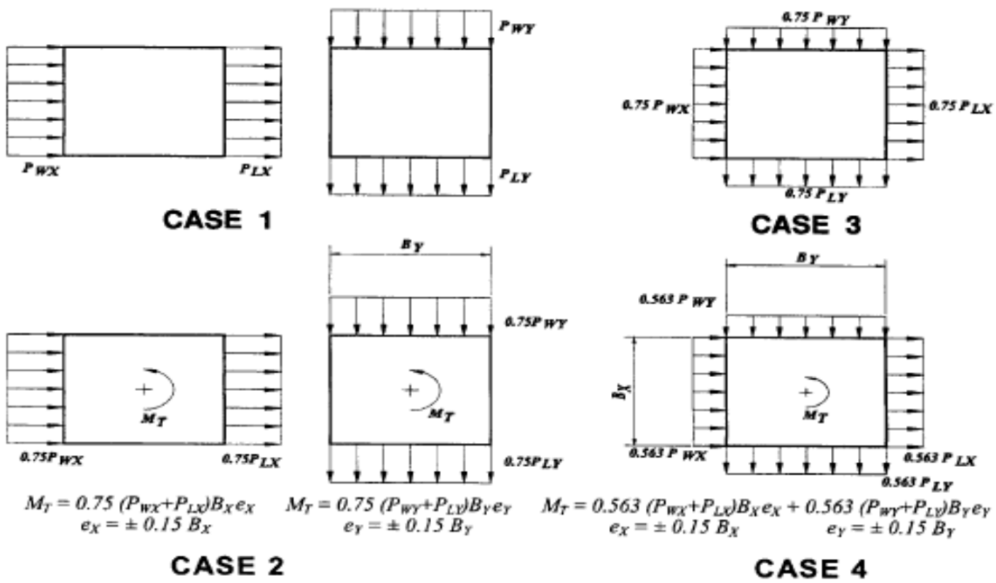
**2:** Calculation of G for Rigid Building

G = 0.883    = 0.925*((1+1.7*gq*Iz(bar)*Q)/(1+1.7*gv*Iz(bar))) , Eq. 26.9-6

**3:** Calculation of Gf for Flexible Building

| | | |
|---|---|---|
| β = | 0.050 | Damping Ratio |
| Ct = | 0.020 | Period Coefficient |
| T = | 0.174 | = Ct*h^(3/4) , sec. (Approximate fundamental period) |
| f = | 5.759 | = 1/T , Hz. (Natural Frequency) |
| V(fps) = | N.A. | = V(mph)*(88/60) , ft./sec. |
| V(bar,zbar) = | N.A. | = b(bar)*(z(bar)/33)^(α(bar))*V*(88/60) , ft./sec. , Eq. 26.9-16 |
| N1 = | N.A. | = f*Lz(bar)/(V(bar,zbar)) , Eq. 26.9-14 |
| Rn = | N.A. | = 7.47*N1/(1+10.3*N1)^(5/3) , Eq. 26.9-13 |
| ηh = | N.A. | = 4.6*f*h/(V(bar,zbar)) |
| Rh = | N.A. | = (1/ηh)-1/(2*ηh^2)*(1-e^(-2*ηh)) for ηh>0, or = 1 for ηh=0 ,Eq. 26.9-15a, b |
| ηb = | N.A. | = 4.6*f*B/(V(bar,zbar)) |
| RB = | N.A. | = (1/ηb)-1/(2*ηb^2)*(1-e^(-2*ηb)) for ηb>0, or = 1 for ηb=0,Eq. 26.9-15a, b |
| ηd = | N.A. | = 15.4*f*L/(V(bar,zbar)) |
| RL = | N.A. | = (1/ηd)-1/(2*ηd^2)*(1-e^(-2*ηd)) for ηd>0, or = 1 for ηd=0 ,Eq. 26.9-15a, b |
| R = | N.A. | = ((1/β)*Rn*Rh*RB*(0.53+0.47*RL))^(1/2) , Eq. 26.9-12 |
| Gf = | N.A. | = 0.925*(1+1.7*Iz(bar)*(gq^2*Q^2+gr^2*R^2)^(1/2))/(1+1.7*gv*Iz(bar)) , Eq. 26.9-10 |
| Use: G = | 0.850 | |

**Figure 27.4-1 - Design Wind Load Cases of MWFRS for Buildings of All Heights**




**Case 1**: Full design wind pressure acting on the projected area perpendicular to each principal axis of the structure, considered separately along each principal axis.

**Case 2:** Three quarters of the design wind pressure acting on the projected area perpendicular to each principal axis of the structure in conjunction with a torsional moment as shown, considered separately for each principal axis.

**Case 3:** Wind pressure as defined in Case 1, but considered to act simultaneously at 75% of the specified value.

**Case 4**: Wind pressure as defined in Case 2, but considered to act simultaneously at 75% of the specified value.

Notes: 1. Design wind pressures for windward (Pw) and leeward (PL) faces shall be determined in accordance with the provisions of Section 27.4.1 and 27.4.2 as applicable for buildings of all heights.
2. Above diagrams show plan views of building.
3. Notation:
$P_{wx}$, $P_{wy}$ = Windward face pressure acting in the X, Y principal axis, respectively.
$P_{Lx}$, $P_{Ly}$ = Leeward face pressure acting in the X, Y principal axis, respectively.
e ($e_x$, $e_y$) = Eccentricity for the X, Y principal axis of the structure, respectively.
$M_T$ = Torsional moment per unit height acting about a vertical axis of the building.

**Net Design Wind Pressure, $p_{net30}$, in lb/ft$^2$, for Exposure B at $h$ = 30 ft, $V$= 95–130 mph**

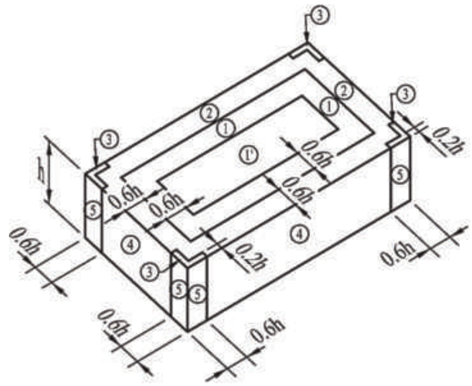
| | Zone | Effective Wind Area (ft$^2$) | Basic Wind Speed (mph) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 95 | | 100 | | 105 | | 110 | | 115 | | 120 | | 130 | |
| Walls | 4 | 10 | 16.2 | −17.6 | 18.0 | −19.5 | 19.8 | −21.5 | 21.8 | −23.6 | 23.8 | −25.8 | 25.9 | −28.1 | 30.4 | −33.0 |
| Walls | 4 | 20 | 15.5 | −16.9 | 17.2 | −18.7 | 18.9 | −20.6 | 20.8 | −22.6 | 22.7 | −24.7 | 24.7 | −26.9 | 29.0 | −31.6 |
| Walls | 4 | 50 | 14.5 | −15.9 | 16.1 | −17.6 | 17.8 | −19.4 | 19.5 | −21.3 | 21.3 | −23.3 | 23.2 | −25.4 | 27.2 | −29.8 |
| Walls | 4 | 100 | 13.8 | −15.2 | 15.3 | −16.8 | 16.9 | −18.5 | 18.5 | −20.4 | 20.2 | −22.2 | 22.0 | −24.2 | 25.9 | −28.4 |
| Walls | 5 | 10 | 16.2 | −21.7 | 18.0 | −24.1 | 19.8 | −26.6 | 21.8 | −29.1 | 23.8 | −31.9 | 25.9 | −34.7 | 30.4 | −40.7 |
| Walls | 5 | 20 | 15.5 | −20.3 | 17.2 | −22.5 | 18.9 | −24.8 | 20.8 | −27.2 | 22.7 | −29.7 | 24.7 | −32.4 | 29.0 | −38.0 |
| Walls | 5 | 50 | 14.5 | −18.3 | 16.1 | −20.3 | 17.8 | −22.4 | 19.5 | −24.6 | 21.3 | −26.9 | 23.2 | −29.3 | 27.2 | −34.3 |
| Walls | 5 | 100 | 13.8 | −16.9 | 15.3 | −18.7 | 16.9 | −20.6 | 18.5 | −22.6 | 20.2 | −24.7 | 22.0 | −26.9 | 25.9 | −31.6 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 1 | 10 | 6.6 | −25.9 | 7.3 | −28.7 | 8.1 | −31.6 | 8.9 | −34.7 | 9.7 | −37.9 | 10.5 | −41.3 | 12.4 | −48.4 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 1 | 20 | 6.2 | −24.2 | 6.9 | −26.8 | 7.6 | −29.5 | 8.3 | −32.4 | 9.1 | −35.4 | 9.9 | −38.5 | 11.6 | −45.2 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 1 | 50 | 5.6 | −21.9 | 6.3 | −24.3 | 6.9 | −26.8 | 7.6 | −29.4 | 8.3 | −32.1 | 9.0 | −34.9 | 10.6 | −41.0 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 1 | 100 | 5.2 | −20.2 | 5.8 | −22.4 | 6.4 | −24.7 | 7.0 | −27.1 | 7.7 | −29.6 | 8.3 | −32.2 | 9.8 | −37.8 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 1′ | 10 | 6.6 | −14.9 | 7.3 | −16.5 | 8.1 | −18.2 | 8.9 | −19.9 | 9.7 | −21.8 | 10.5 | −23.7 | 12.4 | −27.8 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 1′ | 20 | 6.2 | −14.9 | 6.9 | −16.5 | 7.6 | −18.2 | 8.3 | −19.9 | 9.1 | −21.8 | 9.9 | −23.7 | 11.6 | −27.8 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 1′ | 50 | 5.6 | −14.9 | 6.3 | −16.5 | 6.9 | −18.2 | 7.6 | −19.9 | 8.3 | −21.8 | 9.0 | −23.7 | 10.6 | −27.8 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 1′ | 100 | 5.2 | −14.9 | 5.8 | −16.5 | 6.4 | −18.2 | 7.0 | −19.9 | 7.7 | −21.8 | 8.3 | −23.7 | 9.8 | −27.8 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 2 | 10 | 6.6 | −34.1 | 7.3 | −37.8 | 8.1 | −41.7 | 8.9 | −45.7 | 9.7 | −50.0 | 10.5 | −54.4 | 12.4 | −63.9 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 2 | 20 | 6.2 | −31.9 | 6.9 | −35.4 | 7.6 | −39.0 | 8.3 | −42.8 | 9.1 | −46.8 | 9.9 | −50.9 | 11.6 | −59.8 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 2 | 50 | 5.6 | −29.0 | 6.3 | −32.2 | 6.9 | −35.5 | 7.6 | −38.9 | 8.3 | −42.5 | 9.0 | −46.3 | 10.6 | −54.4 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 2 | 100 | 5.2 | −26.8 | 5.8 | −29.7 | 6.4 | −32.8 | 7.0 | −36.0 | 7.7 | −39.3 | 8.3 | −42.8 | 9.8 | −50.2 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 3 | 10 | 6.6 | −46.5 | 7.3 | −51.5 | 8.1 | −56.8 | 8.9 | −62.3 | 9.7 | −68.1 | 10.5 | −74.2 | 12.4 | −87.1 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 3 | 20 | 6.2 | −42.1 | 6.9 | −46.7 | 7.6 | −51.4 | 8.3 | −56.5 | 9.1 | −61.7 | 9.9 | −67.2 | 11.6 | −78.9 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 3 | 50 | 5.6 | −36.3 | 6.3 | −40.2 | 6.9 | −44.4 | 7.6 | −48.7 | 8.3 | −53.2 | 9.0 | −57.9 | 10.6 | −68.0 |
| Flat/Hip/Gable Roof 0 to 7 Degrees | 3 | 100 | 5.2 | −31.9 | 5.8 | −35.4 | 6.4 | −39.0 | 7.0 | −42.8 | 7.7 | −46.8 | 8.3 | −50.9 | 9.8 | −59.8 |
| Gable Roof > 7 to 20 Degrees | 1 | 10 | 9.8 | −30.0 | 10.9 | −33.2 | 12.0 | −36.6 | 13.2 | −40.2 | 14.4 | −44.0 | 15.7 | −47.9 | 18.4 | −56.2 |
| Gable Roof > 7 to 20 Degrees | 1 | 20 | 8.9 | −30.0 | 9.8 | −33.2 | 10.8 | −36.6 | 11.9 | −40.2 | 13.0 | −44.0 | 14.1 | −47.9 | 16.6 | −56.2 |
| Gable Roof > 7 to 20 Degrees | 1 | 50 | 7.6 | −18.2 | 8.4 | −20.2 | 9.3 | −22.3 | 10.2 | −24.5 | 11.1 | −26.7 | 12.1 | −29.1 | 14.2 | −34.2 |
| Gable Roof > 7 to 20 Degrees | 1 | 100 | 6.6 | −9.4 | 7.3 | −10.4 | 8.1 | −11.4 | 8.9 | −12.5 | 9.7 | −13.7 | 10.5 | −14.9 | 12.4 | −17.5 |
| Gable Roof > 7 to 20 Degrees | 2e | 10 | 9.8 | −30.0 | 10.9 | −33.2 | 12.0 | −36.6 | 13.2 | −40.2 | 14.4 | −44.0 | 15.7 | −47.9 | 18.4 | −56.2 |
| Gable Roof > 7 to 20 Degrees | 2e | 20 | 8.9 | −30.0 | 9.8 | −33.2 | 10.8 | −36.6 | 11.9 | −40.2 | 13.0 | −44.0 | 14.1 | −47.9 | 16.6 | −56.2 |
| Gable Roof > 7 to 20 Degrees | 2e | 50 | 7.6 | −18.2 | 8.4 | −20.2 | 9.3 | −22.3 | 10.2 | −24.5 | 11.1 | −26.7 | 12.1 | −29.1 | 14.2 | −34.2 |
| Gable Roof > 7 to 20 Degrees | 2e | 100 | 6.6 | −9.4 | 7.3 | −10.4 | 8.1 | −11.4 | 8.9 | −12.5 | 9.7 | −13.7 | 10.5 | −14.9 | 12.4 | −17.5 |
| Gable Roof > 7 to 20 Degrees | 2n | 10 | 9.8 | −43.8 | 10.9 | −48.5 | 12.0 | −53.4 | 13.2 | −58.7 | 14.4 | −64.1 | 15.7 | −69.8 | 18.4 | −81.9 |
| Gable Roof > 7 to 20 Degrees | 2n | 20 | 8.9 | −37.8 | 9.8 | −41.9 | 10.8 | −46.2 | 11.9 | −50.7 | 13.0 | −55.4 | 14.1 | −60.4 | 16.6 | −70.8 |
| Gable Roof > 7 to 20 Degrees | 2n | 50 | 7.6 | −30.0 | 8.4 | −33.2 | 9.3 | −36.6 | 10.2 | −40.2 | 11.1 | −44.0 | 12.1 | −47.9 | 14.2 | −56.2 |
| Gable Roof > 7 to 20 Degrees | 2n | 100 | 6.6 | −24.1 | 7.3 | −26.7 | 8.1 | −29.4 | 8.9 | −32.3 | 9.7 | −35.3 | 10.5 | −38.4 | 12.4 | −45.1 |
| Gable Roof > 7 to 20 Degrees | 2r | 10 | 9.8 | −43.8 | 10.9 | −48.5 | 12.0 | −53.4 | 13.2 | −58.7 | 14.4 | −64.1 | 15.7 | −69.8 | 18.4 | −81.9 |
| Gable Roof > 7 to 20 Degrees | 2r | 20 | 8.9 | −37.8 | 9.8 | −41.9 | 10.8 | −46.2 | 11.9 | −50.7 | 13.0 | −55.4 | 14.1 | −60.4 | 16.6 | −70.8 |
| Gable Roof > 7 to 20 Degrees | 2r | 50 | 7.6 | −30.0 | 8.4 | −33.2 | 9.3 | −36.6 | 10.2 | −40.2 | 11.1 | −44.0 | 12.1 | −47.9 | 14.2 | −56.2 |
| Gable Roof > 7 to 20 Degrees | 2r | 100 | 6.6 | −24.1 | 7.3 | −26.7 | 8.1 | −29.4 | 8.9 | −32.3 | 9.7 | −35.3 | 10.5 | −38.4 | 12.4 | −45.1 |
| Gable Roof > 7 to 20 Degrees | 3e | 10 | 9.8 | −43.8 | 10.9 | −48.5 | 12.0 | −53.4 | 13.2 | −58.7 | 14.4 | −64.1 | 15.7 | −69.8 | 18.4 | −81.9 |
| Gable Roof > 7 to 20 Degrees | 3e | 20 | 8.9 | −37.8 | 9.8 | −41.9 | 10.8 | −46.2 | 11.9 | −50.7 | 13.0 | −55.4 | 14.1 | −60.4 | 16.6 | −70.8 |
| Gable Roof > 7 to 20 Degrees | 3e | 50 | 7.6 | −30.0 | 8.4 | −33.2 | 9.3 | −36.6 | 10.2 | −40.2 | 11.1 | −44.0 | 12.1 | −47.9 | 14.2 | −56.2 |
| Gable Roof > 7 to 20 Degrees | 3e | 100 | 6.6 | −24.1 | 7.3 | −26.7 | 8.1 | −29.4 | 8.9 | −32.3 | 9.7 | −35.3 | 10.5 | −38.4 | 12.4 | −45.1 |
| Gable Roof > 7 to 20 Degrees | 3r | 10 | 9.8 | −52.0 | 10.9 | −57.6 | 12.0 | −63.5 | 13.2 | −69.7 | 14.4 | −76.2 | 15.7 | −83.0 | 18.4 | −97.4 |
| Gable Roof > 7 to 20 Degrees | 3r | 20 | 8.9 | −44.6 | 9.8 | −49.4 | 10.8 | −54.4 | 11.9 | −59.7 | 13.0 | −65.3 | 14.1 | −71.1 | 16.6 | −83.4 |
| Gable Roof > 7 to 20 Degrees | 3r | 50 | 7.6 | −34.7 | 8.4 | −38.4 | 9.3 | −42.4 | 10.2 | −46.5 | 11.1 | −50.8 | 12.1 | −55.4 | 14.2 | −65.0 |
| Gable Roof > 7 to 20 Degrees | 3r | 100 | 6.6 | −27.2 | 7.3 | −30.2 | 8.1 | −33.3 | 8.9 | −36.5 | 9.7 | −39.9 | 10.5 | −43.5 | 12.4 | −51.0 |

*Notes:* Plus and minus signs signify pressures acting toward and away from the surfaces, respectively. For effective wind areas between those given above, the load may be interpolated; otherwise, use the load associated with the lower effective area. Gray shading indicates that the final value, including all permitted reductions, used in the design shall not be less than that required by Section 30.2.2.
Metric conversions: 1.0 ft = 0.3048 m; 1.0 ft$^2$ = 0.0929 m$^2$; 1.0 lb/ft$^2$ = 0.0479 kN/m$^2$.

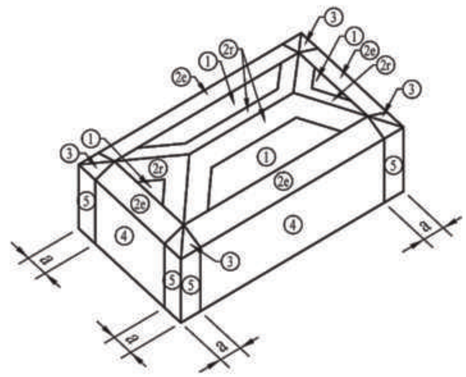
**FIGURE 30.4-1 (*Continued*). Components and Cladding, Part 2 [$h \leq 60$ ft ($h \leq 18.3$ m)]: Design Wind Pressures for Enclosed Buildings—Walls and Roofs**

*continues*

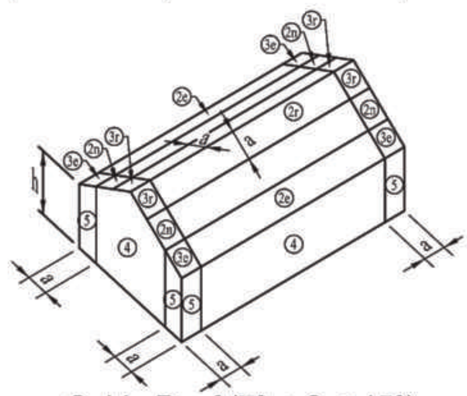
### *Diagrams*




Flat/Hip/Gable (0° ≤ Θ ≤ 7°)




Hip Roof (7° ≤ Θ ≤ 45°)




Gable Roof (7° < Θ ≤ 45°)

### *Notation*

$a$ = 10% of least horizontal dimension or 0.4$h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

**Exception:** For buildings with θ = 0° to 7° and a least horizontal dimension greater than 300 ft (90 m), dimension $a$ shall be limited to a maximum of 0.8 $h$.

$h$ = Mean roof height, in ft (m), except that eave height shall be used for roof angles <10°.

θ = Angle of plane of roof from horizontal, in degrees.

### *Notes*

1. Pressures shown are applied normal to the surface, for Exposure B, at $h$ = 30 ft (9.1 m). Adjust to other conditions using Eq. (30.4-1).
2. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
3. For hip roofs with θ ≤ 25°, Zone 3 shall be treated as Zone 2e and 2r.
4. For effective wind areas between those given, values may be in terpolated; otherwise use the value associated with the lower effective wind area.
5. If overhangs exist, the lesser horizontal dimension of the building shall not include any overhang dimension, but the edge distance, $a$, shall be measured from the outside edge of the overhang.

**FIGURE 30.4-1 Components and Cladding, Part 2 [$h \leq 60$ ft ($h \leq 18.3$ m)]: Design Wind Pressures for Enclosed Buildings—Walls and Roofs**

*continues*

## GIRT WIND LOAD

ASCE 7-16, PART 1: LOW-RISE BUILDINGS, CHAPTER 30, WIND LOADS: COMPONENTS AND CLADDING

Project: Storage Building
Date: 11.18.2023

ASCE 7-16
Table C30.3-1 Walls for Building..., p. 783

| | | | | | |
|---|---|---|---|---|---|
| Girt Area, A = | 65.38 | $10<A<500$ ft$^2$ | Building Dimensons | | |
| | | | L= | 74 ft | |
| Positive | Cpi | | W= | 40 ft | |
| Zones 4 and 5 | 0.86 | | h= | 17.9 ft | |
| | | | | | |
| Negative | | | **a=** | | |
| Zone 4 | -0.96 | | 10% least | 4.00 ft | **<-- Contols!** |
| | | | 0.4h | 7.16 | |
| Negative | | | 4% W | 1.6 | |
| Zone 5 | -1.11 | | | 3 | |

| | | |
|---|---|---|
| qh= | 14.75 | lb/ft$^2$ |
| Cpi = +0.18 | 0.18 | |
| Cpi = -0.18 | -0.18 | |

qh = qh(Gcpi-Cp+/-0.18 Part 1: Low Rise Buildings, EQ (30.3-1)

| | Cpi = +0.18 | Cpi = -0.18 |
|---|---|---|
| Zone 4 pos. | 9.97 | **15.28** |
| Zone 4 neg. | **-16.76** | -11.45 |
| Zone 5 pos. | 9.97 | **15.28** |
| Zone 5 neg. | **-19.06** | -13.75 |

30.2.2 Minimum Design Wind Pressure

Not less than a net pressure of **16 lb/ft$^2$** acting in either direction normal to the surface

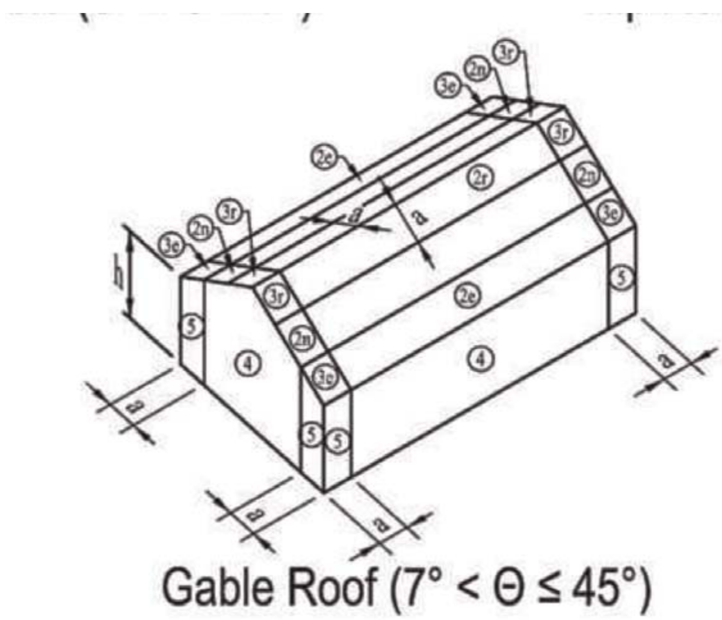
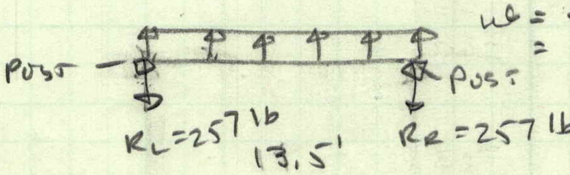



FIGURE 30.4-1, P 351

## WALL GIRTS (C & C)




$w = -19.06\ lb/ft^2$ (2' ft TRIB)
$= -38.12\ lb/ft$

$$M = \frac{wl^2}{8} = \frac{38.12(13.5')^2}{8}$$

$= 868.4$ ft-lb (12 in/ft)
$= 10421$ in-lb

$$S = \frac{M}{F_b} = \frac{10421\ in\text{-}lb}{900\ \frac{lb}{in^2}\ (1.6\ C_{D_{WIND}})}$$ NDS TABLE 4A, p. 34

$= 7.24\ in^3$

2x6 $S = 7.56\ in^3$

∴ **USE: 2x6 #2 D.F @ 24" OC GIRTS**

USE: SIMPSON A35 EACH END 2x6 GIRT
W/ (12) 0.131 x 1½ SIMPSON NAILS OR (12)
SIMPSON (SD1112) #9 x 1½" SCREWS

Project: Benton-Co_Storage-Bldg

StruCalc Version 11.1.8.0 Monday/10/30/2023 12:09:23 PM

page / of

Location: FJ1
Floor Joist
Floor Joist [2021 International Building Code(2018 NDS)
10.25 FT @ 16 O.C.
TJI 110 / 16 - iLevel Trus Joist
Section Adequate By: 43.7%
Controlling Factor: End Reaction

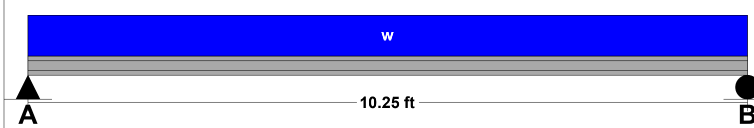
| **DEFLECTIONS** | Center | |
|---|---|---|
| Live Load | 0.11 | IN L/1154 |
| Dead Load | 0.01 | in |
| Total Load | 0.12 | IN L/1030 |

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

| **REACTIONS** | A | | B | |
|---|---|---|---|---|
| Live Load | 854 | lb | 854 | lb |
| Dead Load | 103 | lb | 103 | lb |
| Total Load | 957 | lb | 957 | lb |
| Bearing Length | 3.50 | in | 3.50 | in |
| Web Stiffeners | No | | No | |

| **SUPPORT LOADS** | A | | B | |
|---|---|---|---|---|
| Live Load | 641 | plf | 641 | plf |
| Dead Load | 77 | plf | 77 | plf |
| Total Load | 718 | plf | 718 | plf |

**LOADING DIAGRAM**




| **JOIST DATA** | Center | |
|---|---|---|
| Span Length | 10.25 | ft |
| Unbraced Length-Top | 0 | ft |
| Unbraced Length-Bottom | 0 | ft |

Floor sheathing applied to top of joists-top of joists fully braced.
Floor Duration Factor 1.00

**JOIST LOADING**

| **Uniform Floor Loading** | | Center | |
|---|---|---|---|
| Live Load | LL = | 125 | psf |
| Dead Load | DL = | 15 | psf |
| Total Load | TL = | 140 | psf |
| TL Adj. For Joist Spacing | wT = | 186.7 | plf |

**I-JOIST PROPERTIES**

TJI 110 / 16 - iLevel Trus Joist

| | | Base Values | | | Adjusted | |
|---|---|---|---|---|---|---|
| Moment Cap: | Mcap = *Cd = 1.00* | 4280 | ft-lb | Mcap' = | 4280 | ft-lb |
| Shear Stress: | Vcap = *Cd = 1.00* | 2145 | lb | Vcap' = | 2145 | lb |
| Reaction A: | Rcap = | 1375 | lb | Rcap' = | 1375 | lb |
| Reaction B: | Rcap = | 1375 | lb | Rcap' = | 1375 | lb |
| E.I.: | EI = | 535 | lb-in2 | EI' = | 535 | lb-in2 |

**Controlling Moment:** 2451 ft-lb
5.12 Ft from left support of span 3 (Right Span)
Created by combining all dead and live loads.
**Controlling Shear:** -957 lb
10.0 Ft from left support of span 2 (Center Span)
Created by combining all dead and live loads.

| **Comparisons with required sections:** | Req'd | | Provided | |
|---|---|---|---|---|
| E.I.: | 223 | in2-lb E6 | 535 | in2-lb xE6 |
| Moment: | 2451 | ft-lb | 4280 | ft-lb |
| Shear: | -957 | lb | 2145 | lb |

Project: Benton-Co_Storage-Bldg

Location: FTG_B/6A
Footing
Footing [2021 International Building Code(ACI 318-14)
Footing Size: 3.0 FT Round Diameter X 36.00 IN Deep
Reinforcement: #4 Bars @ 2.54 IN. O.C. E/W / (11) min.
Section Footing Design Adequate

**FOOTING PROPERTIES**

| | | | |
|---|---|---|---|
| Allowable Soil Bearing Pressure: | Qs = | 1500 | psf |
| Concrete Compressive Strength: | F'c = | 3000 | psi |
| Reinforcing Steel Yield Strength: | Fy = | 60000 | psi |
| Concrete Reinforcement Cover: | c = | 3 | in |

**FOOTING SIZE**

| | | | |
|---|---|---|---|
| Diameter: | Dia. = | 3 | ft |
| Effective Depth to Top Layer of Steel: | d = | 32.25 | in |

**COLUMN AND BASEPLATE SIZE**

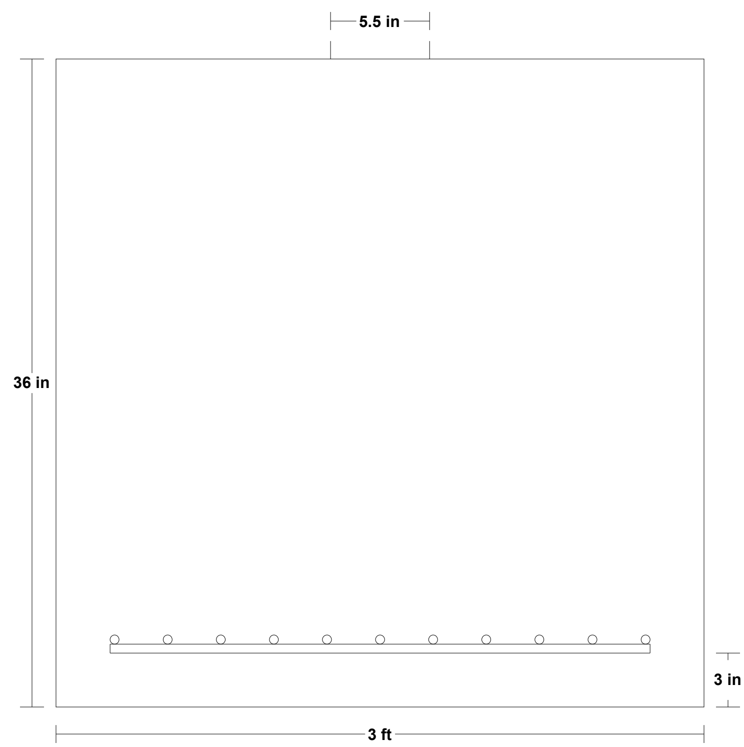
| | | | |
|---|---|---|---|
| Column Type: | Wood | | |
| Column Width: | m = | 5.5 | in |
| Column Depth: | n = | 5.5 | in |

**FOOTING CALCULATIONS**

| | | | |
|---|---|---|---|
| **Bearing Calculations:** | | | |
| Ultimate Bearing Pressure: | Qu = | 763 | psf |
| Effective Allowable Soil Bearing Pressure: | Qe = | 1050 | psf |
| Required Footing Area: | Areq = | 5.13 | sf |
| Area Provided: | A = | 7.07 | sf |
| **Baseplate Bearing:** | | | |
| Bearing Required: | Bear = | 8008 | lb |
| Allowable Bearing: | Bear-A = | 100279 | lb |
| **Beam Shear Calculations (One Way Shear):** | | | |
| Beam Shear: | Vu1 = | 0 | lb |
| Allowable Beam Shear: | Vc1 = | 84534 | lb |
| **Punching Shear Calculations (Two Way Shear):** | | | |
| Critical Perimeter: | Bo = | 0 | in |
| Punching Shear: | Vu2 = | 0 | lb |
| Allowable Punching Shear (ACI 11-35): | vc2-a = | 0 | lb |
| Allowable Punching Shear (ACI 11-36): | vc2-b = | 0 | lb |
| Allowable Punching Shear (ACI 11-37): | vc2-c = | 0 | lb |
| Controlling Allowable Punching Shear: | vc2 = | 0 | lb |
| **Bending Calculations:** | | | |
| Factored Moment: | Mu = | 31936 | in-lb |
| Nominal Moment Strength: | Mn = | 3668480 | in-lb |
| **Reinforcement Calculations:** | | | |
| Concrete Compressive Block Depth: | a = | 1.59 | in |
| Steel Required Based on Moment: | As(1) = | 0.02 | in2 |
| Min. Code Req'd Reinf. Flex. Members (ACI-150.1): | As(2) = | 2.07 | in2 |
| Controlling Reinforcing Steel: | As-reqd = | 2.07 | in2 |
| Selected Reinforcement: | #4's @ 2.5 in. o.c. e/w (11) Min. | | |
| Reinforcement Area Provided: | As = | 2.16 | in2 |
| **Development Length Calculations:** | | | |
| Development Length Required: | Ld = | 15 | in |
| Development Length Supplied: | Ld-sup = | 12.95 | in |

Note: Plain concrete adequate for bending,
therefore adequate development length not required.

**LOADING DIAGRAM**




**FOOTING LOADING**

| | | | |
|---|---|---|---|
| Live Load: | PL = | 3850 | lb |
| Dead Load: | PD = | 1540 | lb |
| Total Load: | PT = | 5390 | lb |
| Ultimate Factored Load: | Pu = | 8008 | lb |
| Footing plus soil above footing weight: | Wt = | 2050 | lb |

Location: FTG_G/3G
Footing
Footing [2021 International Building Code(ACI 318-14)
Footing Size: 3.0 FT Round Diameter X 36.00 IN Deep
Reinforcement: #4 Bars @ 2.54 IN. O.C. E/W / (11) min.
Section Footing Design Adequate

StruCalc Version 11.1.8.0 Saturday/11/18/2023 11:24:09 AM

**FOOTING PROPERTIES**

| | | |
|---|---|---|
| Allowable Soil Bearing Pressure: | Qs = | 1500 psf |
| Concrete Compressive Strength: | F'c = | 3000 psi |
| Reinforcing Steel Yield Strength: | Fy = | 60000 psi |
| Concrete Reinforcement Cover: | c = | 3 in |

**FOOTING SIZE**

| | | |
|---|---|---|
| Diameter: | Dia. = | 3 ft |
| Effective Depth to Top Layer of Steel: | d = | 32.25 in |

**COLUMN AND BASEPLATE SIZE**

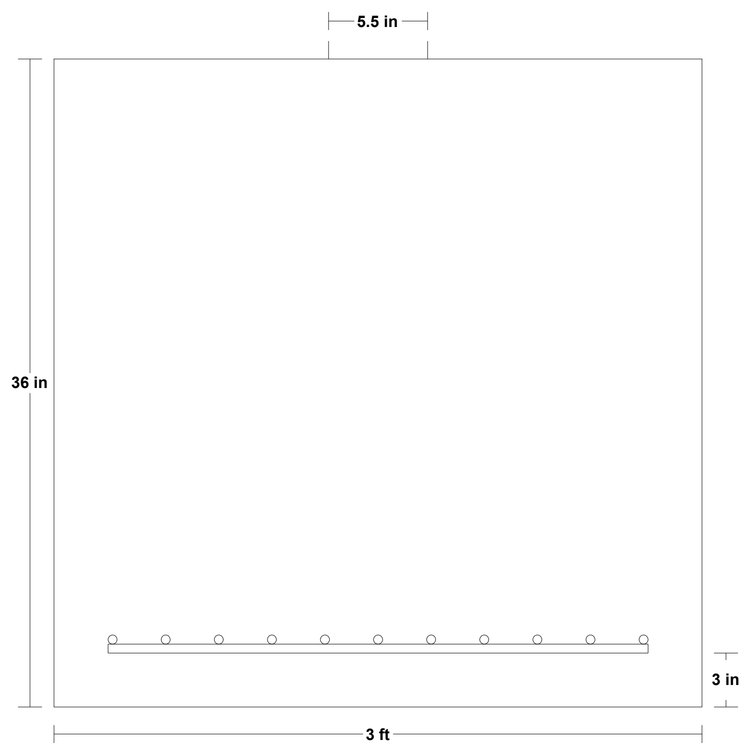
| | | |
|---|---|---|
| Column Type: | Wood | |
| Column Width: | m = | 5.5 in |
| Column Depth: | n = | 5.5 in |

**FOOTING CALCULATIONS**

| | | | |
|---|---|---|---|
| **Bearing Calculations:** | | | |
| Ultimate Bearing Pressure: | Qu = | 263 | psf |
| Effective Allowable Soil Bearing Pressure: | Qe = | 1050 | psf |
| Required Footing Area: | Areq = | 1.77 | sf |
| Area Provided: | A = | 7.07 | sf |
| **Baseplate Bearing:** | | | |
| Bearing Required: | Bear = | 2758 | lb |
| Allowable Bearing: | Bear-A = | 100279 | lb |
| **Beam Shear Calculations (One Way Shear):** | | | |
| Beam Shear: | Vu1 = | 0 | lb |
| Allowable Beam Shear: | Vc1 = | 84534 | lb |
| **Punching Shear Calculations (Two Way Shear):** | | | |
| Critical Perimeter: | Bo = | 0 | in |
| Punching Shear: | Vu2 = | 0 | lb |
| Allowable Punching Shear (ACI 11-35): | vc2-a = | 0 | lb |
| Allowable Punching Shear (ACI 11-36): | vc2-b = | 0 | lb |
| Allowable Punching Shear (ACI 11-37): | vc2-c = | 0 | lb |
| Controlling Allowable Punching Shear: | vc2 = | 0 | lb |
| **Bending Calculations:** | | | |
| Factored Moment: | Mu = | 10997 | in-lb |
| Nominal Moment Strength: | Mn = | 3668480 | in-lb |
| **Reinforcement Calculations:** | | | |
| Concrete Compressive Block Depth: | a = | 1.59 | in |
| Steel Required Based on Moment: | As(1) = | 0.01 | in2 |
| Min. Code Req'd Reinf. Flex. Members (ACI-150.1): | As(2) = | 2.07 | in2 |
| Controlling Reinforcing Steel: | As-reqd = | 2.07 | in2 |
| Selected Reinforcement: | #4's @ 2.5 in. o.c. e/w (11) Min. | | |
| Reinforcement Area Provided: | As = | 2.16 | in2 |
| **Development Length Calculations:** | | | |
| Development Length Required: | Ld = | 15 | in |
| Development Length Supplied: | Ld-sup = | 12.95 | in |

Note: Plain concrete adequate for bending,
therefore adequate development length not required.

**LOADING DIAGRAM**




**FOOTING LOADING**

| | | |
|---|---|---|
| Live Load: | PL = | 1326 lb |
| Dead Load: | PD = | 530 lb |
| Total Load: | PT = | 1856 lb |
| Ultimate Factored Load: | Pu = | 2758 lb |
| Footing plus soil above footing weight: | Wt = | 2050 lb |

Project: Benton-Co_Storage-Bldg



StruCalc Version 11.1.8.0 Monday/11/20/2023 6:36:40 AM

page / of

Location: H1
Multi-Loaded Multi-Span Beam
Multi-Loaded Multi-Span Beam [2021 International Building Code(2018 NDS)
3.5 IN x 7.25 IN x 3.67 FT
#2 - Douglas-Fir-Larch - Dry Use
Section Adequate By: 130.0%
Controlling Factor: Shear

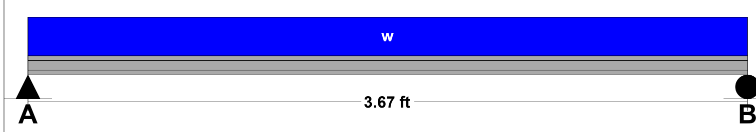
| DEFLECTIONS | Center | |
|---|---|---|
| Live Load | 0.01 | IN L/3003 |
| Dead Load | 0.00 | in |
| Total Load | 0.02 | IN L/2660 |

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

| REACTIONS | A | | B | |
|---|---|---|---|---|
| Live Load | 1173 | lb | 1173 | lb |
| Dead Load | 151 | lb | 151 | lb |
| Total Load | 1324 | lb | 1324 | lb |
| Bearing Length | 0.61 | in | 0.61 | in |

| BEAM DATA | Center | |
|---|---|---|
| Span Length | 3.67 | ft |
| Unbraced Length-Top | 0 | ft |
| Unbraced Length-Bottom | 3.67 | ft |
| Live Load Duration Factor | 1.00 | |
| Notch Depth | 0.00 | |

**LOADING DIAGRAM**




| UNIFORM LOADS | Center | |
|---|---|---|
| Uniform Live Load | 639 | plf |
| Uniform Dead Load | 77 | plf |
| Beam Self Weight | 6 | plf |
| Total Uniform Load | 722 | plf |

**MATERIAL PROPERTIES**
#2 - Douglas-Fir-Larch

| | Base Values | | | Adjusted | | |
|---|---|---|---|---|---|---|
| Bending Stress: | Fb = | 900 | psi | Fb' = | 1170 | psi |
| | *Cd=1.00 CF=1.30* | | | | | |
| Shear Stress: | Fv = | 180 | psi | Fv' = | 180 | psi |
| | *Cd=1.00* | | | | | |
| Modulus of Elasticity: | E = | 1600 | ksi | E' = | 1600 | ksi |
| Comp. ⊥ to Grain: | Fc - ⊥ = | 625 | psi | Fc - ⊥' = | 625 | psi |

**Controlling Moment:** 1215 ft-lb
1.84 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
**Controlling Shear:** -1324 lb
4.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

| Comparisons with required sections: | Req'd | Provided |
|---|---|---|
| Section Modulus: | 12.46 in3 | 30.66 in3 |
| Area (Shear): | 11.03 in2 | 25.38 in2 |
| Moment of Inertia (deflection): | 13.32 in4 | 111.15 in4 |
| Moment: | 1215 ft-lb | 2989 ft-lb |
| Shear: | -1324 lb | 3045 lb |

Project: Benton-Co_Storage-Bldg

Location: H2
Multi-Loaded Multi-Span Beam
Multi-Loaded Multi-Span Beam [2021 International Building Code(2018 NDS)
3.5 IN x 7.25 IN x 3.67 FT
#2 - Douglas-Fir-Larch - Dry Use
Section Adequate By: 8.2%
Controlling Factor: Shear

| **DEFLECTIONS** | Center | |
|---|---|---|
| Live Load | 0.03 | IN L/1407 |
| Dead Load | 0.00 | in |
| Total Load | 0.04 | IN L/1251 |

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

| **REACTIONS** | A | | B | |
|---|---|---|---|---|
| Live Load | 2503 | lb | 2503 | lb |
| Dead Load | 311 | lb | 311 | lb |
| Total Load | 2814 | lb | 2814 | lb |
| Bearing Length | 1.29 | in | 1.29 | in |

| **BEAM DATA** | Center | |
|---|---|---|
| Span Length | 3.67 | ft |
| Unbraced Length-Top | 0 | ft |
| Unbraced Length-Bottom | 3.67 | ft |
| Live Load Duration Factor | 1.00 | |
| Notch Depth | 0.00 | |

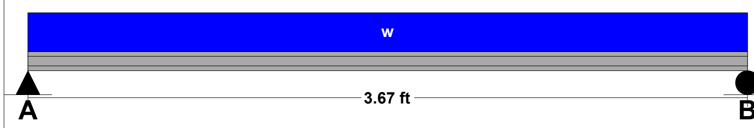
**MATERIAL PROPERTIES**
#2 - Douglas-Fir-Larch

| | Base Values | | | Adjusted | | |
|---|---|---|---|---|---|---|
| Bending Stress: | Fb = | 900 | psi | Fb' = | 1170 | psi |
| | *Cd=1.00 CF=1.30* | | | | | |
| Shear Stress: | Fv = | 180 | psi | Fv' = | 180 | psi |
| | *Cd=1.00* | | | | | |
| Modulus of Elasticity: | E = | 1600 | ksi | E' = | 1600 | ksi |
| Comp. ⊥ to Grain: | Fc - ⊥ = | 625 | psi | Fc - ⊥' = | 625 | psi |

**Controlling Moment:** 2582 ft-lb
1.84 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
**Controlling Shear:** 2814 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

| **Comparisons with required sections:** | Req'd | Provided |
|---|---|---|
| Section Modulus: | 26.48 in3 | 30.66 in3 |
| Area (Shear): | 23.45 in2 | 25.38 in2 |
| Moment of Inertia (deflection): | 28.44 in4 | 111.15 in4 |
| Moment: | 2582 ft-lb | 2989 ft-lb |
| Shear: | 2814 lb | 3045 lb |

**LOADING DIAGRAM**




| **UNIFORM LOADS** | Center | |
|---|---|---|
| Uniform Live Load | 1364 | plf |
| Uniform Dead Load | 164 | plf |
| Beam Self Weight | 6 | plf |
| Total Uniform Load | 1534 | plf |

Project: Benton-Co_Storage-Bldg

Location: H3
Multi-Loaded Multi-Span Beam
Multi-Loaded Multi-Span Beam [2021 International Building Code(2018 NDS)
5.5 IN x 11.5 IN x 13.54 FT
#2 - Douglas-Fir-Larch - Dry Use
Section Adequate By: 229.3%
Controlling Factor: Moment

| **DEFLECTIONS** | Center | |
|---|---|---|
| Live Load | 0.06 | IN L/2562 |
| Dead Load | 0.05 | in |
| Total Load | 0.11 | IN L/1446 |

Live Load Deflection Criteria: L/240 Total Load Deflection Criteria: L/180

| **REACTIONS** | A | | B | |
|---|---|---|---|---|
| Live Load | 515 | lb | 515 | lb |
| Dead Load | 397 | lb | 397 | lb |
| Total Load | 912 | lb | 912 | lb |
| Bearing Length | 0.27 | in | 0.27 | in |

| **BEAM DATA** | Center | |
|---|---|---|
| Span Length | 13.54 | ft |
| Unbraced Length-Top | 0 | ft |
| Unbraced Length-Bottom | 13.54 | ft |
| Live Load Duration Factor | 1.15 | |
| Notch Depth | 0.00 | |

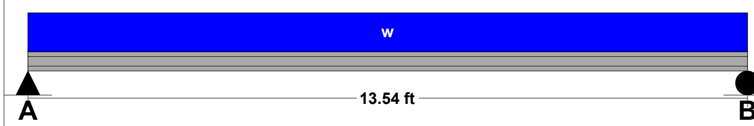
**MATERIAL PROPERTIES**
#2 - Douglas-Fir-Larch

| | Base Values | | | Adjusted | | |
|---|---|---|---|---|---|---|
| Bending Stress: | Fb = | 875 | psi | Fb' = | 1006 | psi |
| | *Cd=1.15 CF=1.00* | | | | | |
| Shear Stress: | Fv = | 170 | psi | Fv' = | 196 | psi |
| | *Cd=1.15* | | | | | |
| Modulus of Elasticity: | E = | 1300 | ksi | E' = | 1300 | ksi |
| Comp. ⊥ to Grain: | Fc - ⊥ = | 625 | psi | Fc - ⊥' = | 625 | psi |

**Controlling Moment:** 3087 ft-lb
6.77 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
**Controlling Shear:** 912 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

| **Comparisons with required sections:** | Req'd | | Provided | |
|---|---|---|---|---|
| Section Modulus: | 36.82 | in3 | 121.23 | in3 |
| Area (Shear): | 7 | in2 | 63.25 | in2 |
| Moment of Inertia (deflection): | 86.8 | in4 | 697.07 | in4 |
| Moment: | 3087 | ft-lb | 10166 | ft-lb |
| Shear: | 912 | lb | 8244 | lb |

**LOADING DIAGRAM**




| **UNIFORM LOADS** | Center | |
|---|---|---|
| Uniform Live Load | 76 | plf |
| Uniform Dead Load | 45 | plf |
| Beam Self Weight | 14 | plf |
| Total Uniform Load | 135 | plf |

## Wood Material Properties

| | Label | Species | Grade | Cm | Emod | Nu | Therm (\1E... | Dens[lb/ft^3] |
|---|---|---|---|---|---|---|---|---|
| 1 | DF-#2 | Douglas Fir-Larch | No.2 | | 1 | .3 | .3 | 35 |

## Wood Section Sets

| | Label | Shape | Type | Design List | Material | Design Rules | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | POLE | 6X6 | Column | Posts | DF-#2 | Typical | 30.25 | 76.255 | 76.255 | 128.871 |
| 2 | BRACE | 2-2X6B | VBrace | Rectangular Double | DF-#2 | Typical | 16.5 | 12.375 | 41.594 | 32.615 |

## Design Size and Code Check Parameters

| | Label | Max Depth[in] | Min Depth[in] | Max Width[in] | Min Width[in] | Max Bending Chk | Max Shear Chk |
|---|---|---|---|---|---|---|---|
| 1 | Typical | | | | | 1 | 1 |

## Wood Design Parameters

| | Label | Shape | Length[... | le2[ft] | le1[ft] | le-bend to... | le-bend bo... | Kyy | Kzz | CV | Cr | y sway | z sway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M1 | POLE | 14.43 | | | | | | | | | | |
| 2 | M2 | POLE | 7.38 | | | | | | | | | | |
| 3 | M3 | BRACE | 10.437 | | | | | | | | | | |

## Member Point Loads (BLC 3 : SEISMIC)

| | Member Label | Direction | Magnitude[lb,lb-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | M2 | X | 2000 | 1.5 |

## Joint Reactions (By Combination)

| | LC | Joint Label | X [lb] | Y [lb] | Z [lb] | MX [lb-ft] | MY [lb-ft] | MZ [lb-ft] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | N1 | 60.305 | 4630.952 | 0 | NC | NC | NC |
| 2 | 1 | N3 | -258.257 | 0 | 0 | 0 | 0 | 0 |
| 3 | 1 | N4 | -1802.048 | -1736.952 | 0 | 0 | 0 | 0 |
| 4 | 1 | Totals: | -2000 | 2894 | 0 | | | |
| 5 | 1 | COG (ft): | X: 0 | Y: 21.81 | Z: 0 | | | |

## Basic Load Cases

| | BLC Description | Category | X Gravity | Y Gravity | Z Gravity | Joint | Point | Distribut... | Area(Memb... | Surface... |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AXIAL Lr | LL | | | | 1 | | | | |
| 2 | AXIAL D | DL | | | | 1 | | | | |
| 3 | SEISMIC | ELX+Y | | | | | 1 | | | |

## Load Combinations

| | Description | Solve | PD... | SR... | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Lr+D+S | Yes | Y | + | 1 | 1 | 2 | 1 | 3 | 1 | | | | | | | | | | |

## Joint Deflections

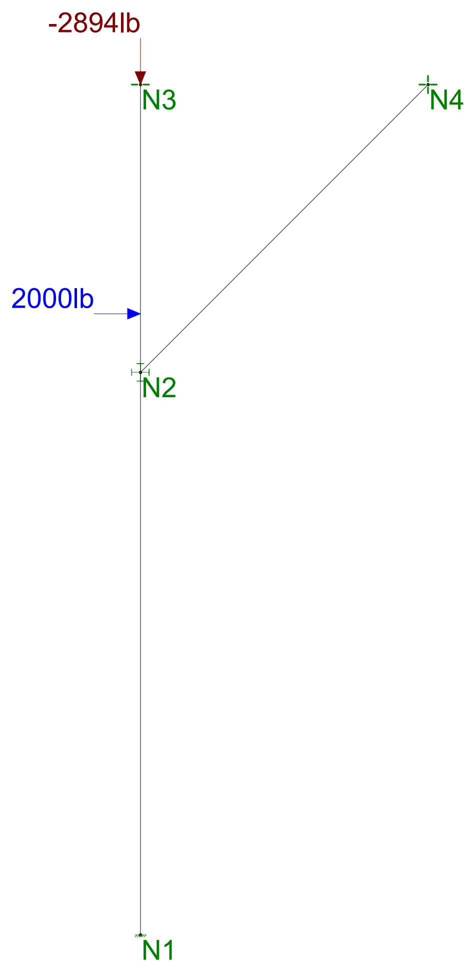
| | LC | Joint Label | X [in] | Y [in] | Z [in] | X Rotation [rad] | Y Rotation [rad] | Z Rotation [rad] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | N1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 1 | N2 | .037 | -.02 | 0 | 0 | 0 | -3.399e-3 |
| 3 | 1 | N3 | 0 | -.027 | 0 | 0 | 0 | 3.626e-3 |
| 4 | 1 | N4 | 0 | 0 | 0 | 0 | 0 | 2.179e-3 |

## Member Section Stresses

| | LC | Member Label | Sec | Axial[psi] | y Shear[psi] | z Shear[psi] | y top Bendin... | y bot Bendin... | z top Bendin... | z bot Bendin... |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | M1 | 1 | 153.089 | -2.912 | 0 | 113.173 | -113.173 | 0 | 0 |
| 2 | | | 2 | 153.089 | -2.912 | 0 | 21.502 | -21.502 | 0 | 0 |
| 3 | | | 3 | 153.089 | -2.912 | 0 | -70.168 | 70.168 | 0 | 0 |
| 4 | | | 4 | 153.089 | -2.912 | 0 | -161.839 | 161.839 | 0 | 0 |
| 5 | | | 5 | 153.089 | -2.912 | 0 | -253.509 | 253.509 | 0 | 0 |
| 6 | 1 | M2 | 1 | 95.669 | 86.271 | 0 | -467.266 | 467.266 | 0 | 0 |
| 7 | | | 2 | 95.669 | -12.902 | 0 | 623.255 | -623.255 | 0 | 0 |
| 8 | | | 3 | 95.669 | -12.902 | 0 | 415.503 | -415.503 | 0 | 0 |
| 9 | | | 4 | 95.669 | -12.902 | 0 | 207.752 | -207.752 | 0 | 0 |
| 10 | | | 5 | 95.669 | -12.902 | 0 | 0 | 0 | 0 | 0 |
| 11 | 1 | M3 | 1 | 151.664 | -4.302 | 0 | 391.887 | -391.887 | 0 | 0 |
| 12 | | | 2 | 151.664 | -4.302 | 0 | 293.915 | -293.915 | 0 | 0 |
| 13 | | | 3 | 151.664 | -4.302 | 0 | 195.944 | -195.944 | 0 | 0 |
| 14 | | | 4 | 151.664 | -4.302 | 0 | 97.972 | -97.972 | 0 | 0 |
| 15 | | | 5 | 151.664 | -4.302 | 0 | 0 | 0 | 0 | 0 |

## Member Wood Code Checks

| | LC | Member | Shape | UC Max | Loc[ft] | Shear ... | Loc[ft] | Dir | Fc'[psi] | Ft'[psi] | Fb1'[psi] | Fb2'[psi] | Fv'[psi] | RB | CL | CP | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | M1 | 6X6 | .764 | 14.43 | .017 | 0 | y | 333.26 | 475 | 750 | 750 | 170 | 5.611 | 1 | .476 | 3.9-3 |
| 2 | 1 | M2 | 6X6 | .961 | 1.537 | .507 | 0 | y | 615.05 | 475 | 750 | 750 | 170 | 4.013 | 1 | .879 | 3.9-3 |
| 3 | 1 | M3 | 2-2X6B | .989 | 0 | .024 | 0 | y | 198.174 | 747.5 | 1161.57 | 1345.5 | 180 | 8.749 | .993 | .133 | 3.9-3 |




Loads: LC 1, Lr+D+S

| | | |
|---|---|---|
| William E. Barlow, P.E. | Storage Bldg, Pole A-4A | 1 |
| WEB | | Nov 19, 2023 at 3:33 PM |
| 23024 | | Benton-Co.r3d |

William E. Barlow. P.E.

P.O. Box 43
Philomath, OR 97370
541-609-8777



# Pole Footing Embedded in Soil

Project File: Benton-Co.ec6

LIC# : KW-06015332, Build:20.23.09.30 William E. Barlow, P.E. 

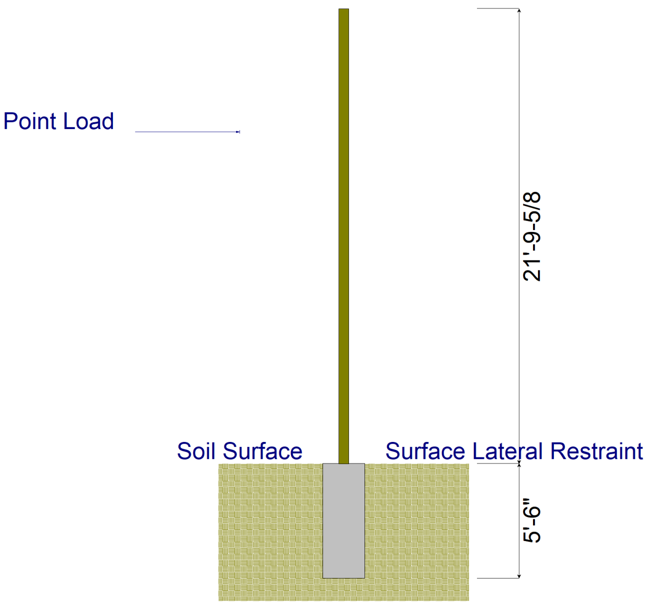
**DESCRIPTION:** POLE FOOTING A/4A

## Code References

Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2021

## General Information

| | |
|---|---|
| Pole Footing Shape | Circular |
| Pole Footing Diameter . . . . . . . . . | 24.0 in |
| Calculate Min. Depth for Allowable Pressures | |
| Lateral Restraint at Ground Surface | |
| Allow Passive . . . . . . . . . . . . . . . . | 250.0 pcf |
| Max Passive . . . . . . . . . . . . . . . . | 1,500.0 psf |




**Controlling Values**

| | |
|---|---|
| Governing Load Combination | +D+0.60W |
| Lateral Load | 1.155 k |
| Moment | 18.376 k-ft |

Restraint @ Ground Surface

| | |
|---|---|
| Pressure at Depth | |
| Actual | **1,290.88** psf |
| Allowable | **1,375.0** psf |
| Surface Retraint Force | 8,254.84 lbs |
| **Minimum Required Depth** | **5.50 ft** |
| Footing Base Area | 3.142 ft^2 |
| Maximum Soil Pressure | 0.9212 ksf |

## Applied Loads

| Lateral Concentrated Load (k) | | Lateral Distributed Loads (k | Applied Moment (kft) | Vertical Load (k) |
|---|---|---|---|---|
| D : Dead Load | k | k/ft | k-ft | 0.8270 k |
| Lr : Roof Live | k | k/ft | k-ft | 2.067 k |
| L : Live | k | k/ft | k-ft | k |
| S : Snow | k | k/ft | k-ft | k |
| W : Wind | 1.925 k | k/ft | k-ft | k |
| E : Earthquake | 0.0 k | k/ft | k-ft | k |
| H : Lateral Earth | k | k/ft | k-ft | k |
| Load distance above ground surface | 15.910 ft | TOP of Load above ground surface 21.80 ft | | |
| | | BOTTOM of Load above ground surface ft | | |

## Load Combination Results

| Load Combination | Forces @ Ground Surface Loads - (k) | Moments - (ft-k) | Required Depth - (ft) | Pressure at Depth Actual - (psf) | Allow - (psf) | Soil Increase Factor |
|---|---|---|---|---|---|---|
| D Only | 0.000 | 0.000 | 0.13 | 0.0 | 31.3 | 1.000 |
| +D+Lr | 0.000 | 0.000 | 0.13 | 0.0 | 31.3 | 1.000 |
| +D+0.750Lr | 0.000 | 0.000 | 0.13 | 0.0 | 31.3 | 1.000 |
| +D+0.60W | 1.155 | 18.376 | 5.50 | 1,290.9 | 1,375.0 | 1.000 |
| +D+0.750Lr+0.450W | 0.866 | 13.782 | 5.00 | 1,171.5 | 1,250.0 | 1.000 |
| +D+0.450W | 0.866 | 13.782 | 5.00 | 1,171.5 | 1,250.0 | 1.000 |
| +0.60D+0.60W | 1.155 | 18.376 | 5.50 | 1,290.9 | 1,375.0 | 1.000 |
| +0.60D | 0.000 | 0.000 | 0.13 | 0.0 | 31.3 | 1.000 |

StruCalc Version 11.1.8.0 Tuesday/11/14/2023 10:19:04 AM

page / of

Project: Benton-Co_Storage-Bldg

Location: PURLIN
Multi-Loaded Multi-Span Beam
Multi-Loaded Multi-Span Beam [2021 International Building Code(2018 NDS)
1.5 IN x 9.25 IN x 13.54 FT
#2 - Douglas-Fir-Larch - Dry Use
Section Adequate By: 6.7%
Controlling Factor: Moment

| **DEFLECTIONS** | Center | |
|---|---|---|
| Live Load | 0.24 | IN L/680 |
| Dead Load | 0.16 | in |
| Total Load | 0.40 | IN L/410 |

Live Load Deflection Criteria: L/240 Total Load Deflection Criteria: L/180

| **REACTIONS** | A | | B | |
|---|---|---|---|---|
| Live Load | 339 | lb | 339 | lb |
| Dead Load | 223 | lb | 223 | lb |
| Total Load | 562 | lb | 562 | lb |
| Bearing Length | 0.60 | in | 0.60 | in |

| **BEAM DATA** | Center | |
|---|---|---|
| Span Length | 13.54 | ft |
| Unbraced Length-Top | 0 | ft |
| Unbraced Length-Bottom | 13.54 | ft |
| Live Load Duration Factor | 1.15 | |
| Notch Depth | 0.00 | |

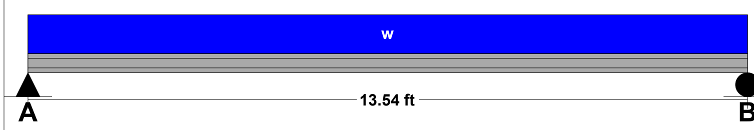
**MATERIAL PROPERTIES**
#2 - Douglas-Fir-Larch

| | Base Values | | | Adjusted | | |
|---|---|---|---|---|---|---|
| Bending Stress: | Fb = | 900 | psi | Fb' = | 1139 | psi |
| | *Cd=1.15 CF=1.10* | | | | | |
| Shear Stress: | Fv = | 180 | psi | Fv' = | 207 | psi |
| | *Cd=1.15* | | | | | |
| Modulus of Elasticity: | E = | 1600 | ksi | E' = | 1600 | ksi |
| Comp. ⊥ to Grain: | Fc - ⊥ = | 625 | psi | Fc - ⊥' = | 625 | psi |

**Controlling Moment:** 1902 ft-lb
6.77 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2
**Controlling Shear:** 562 lb
At left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

| **Comparisons with required sections:** | Req'd | | Provided | |
|---|---|---|---|---|
| Section Modulus: | 20.05 | in3 | 21.39 | in3 |
| Area (Shear): | 4.07 | in2 | 13.88 | in2 |
| Moment of Inertia (deflection): | 43.46 | in4 | 98.93 | in4 |
| Moment: | 1902 | ft-lb | 2029 | ft-lb |
| Shear: | 562 | lb | 1915 | lb |

**LOADING DIAGRAM**




| **UNIFORM LOADS** | Center | |
|---|---|---|
| Uniform Live Load | 50 | plf |
| Uniform Dead Load | 30 | plf |
| Beam Self Weight | 3 | plf |
| Total Uniform Load | 83 | plf |

Project: Benton-Co_Storage-Bldg

Location: STAIR STRINGER
Multi-Loaded Multi-Span Beam
Multi-Loaded Multi-Span Beam [2021 International Building Code(2018 NDS)
1.75 IN x 14.0 IN x 13.75 FT (Actual 16.4 FT)
1.55E Timberstrand LSL - iLevel Trus Joist
Section Adequate By: 2.9%
Controlling Factor: Deflection

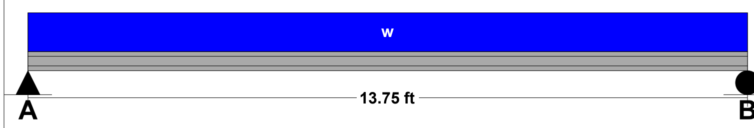
| **DEFLECTIONS** | Center | |
|---|---|---|
| Live Load | 0.40 | IN L/494 |
| Dead Load | 0.07 | in |
| Total Load | 0.47 | IN L/417 |

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

| **REACTIONS** | A | B |
|---|---|---|
| Live Load | 1487 lb | 1487 lb |
| Dead Load | 275 lb | 275 lb |
| Total Load | 1762 lb | 1762 lb |
| Bearing Length | 1.12 in | 1.12 in |

| **BEAM DATA** | Center |
|---|---|
| Span Length | 13.75 ft |
| Unbraced Length-Top | 0 ft |
| Unbraced Length-Bottom | 13.75 ft |
| Beam End Elevation Difference | 8.9 ft |
| Live Load Duration Factor | 1.00 |
| Notch Depth | 0.00 |

**LOADING DIAGRAM**




| **UNIFORM LOADS** | Center | |
|---|---|---|
| Uniform Live Load | 216 | plf |
| Uniform Dead Load | 26 | plf |
| Beam Self Weight | 8 | plf |
| Total Uniform Load | 250 | plf |

**MATERIAL PROPERTIES**

1.55E Timberstrand LSL - iLevel Trus Joist

| | Base Values | Adjusted |
|---|---|---|
| Bending Stress: | Fb = 2325 psi<br>*Cd=1.00 CF=0.99* | Fb' = 2292 psi |
| Shear Stress: | Fv = 525 psi<br>*Cd=1.00* | Fv' = 525 psi |
| Modulus of Elasticity: | E = 1550 ksi | E' = 1550 ksi |
| Comp. ⊥ to Grain: | Fc - ⊥ = 900 psi | Fc - ⊥' = 900 psi |

**Controlling Moment:** 6057 ft-lb
6.875 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

**Controlling Shear:** -1479 lb
13.432 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

| **Comparisons with required sections:** | Req'd | Provided |
|---|---|---|
| Section Modulus: | 31.71 in3 | 57.17 in3 |
| Area (Shear): | 4.23 in2 | 24.5 in2 |
| Moment of Inertia (deflection): | 388.77 in4 | 400.17 in4 |
| Moment: | 6057 ft-lb | 10920 ft-lb |
| Shear: | -1479 lb | 8575 lb |